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Britain's Cinderella Industry

THE failure of the U.K. Government to grant taxation concessions to non-ferrous metal mining was deplored by the Cornish Mining Development Association at its annual meeting on May 4.

Reference was made in the report of the Executive Committee to the major debate on home mining and taxation which took place on June 19, during the committee stage of the Finance Bill in the Commons, and to the debate in the Lords arising from Lord Jowitt's speech on December 18, in which attention was drawn to the importance and urgency of exploiting the mineral resources of Britain. Mention was also made of a discussion which took place between the president of the Association, Mr. F. Lyde Caunter, and the Chancellor of the Exchequer, in which the latter gave the impression of wishing to do something to help the non-ferrous mining industry in the U.K.

"Notwithstanding these activities," continued the report, "the claim of the non-ferrous metal industry at home to be taxed in a more realistic manner has once again been completely ignored in the recent Budget speech. This is all the more amazing, when it is realized how much other governments are now doing to encourage their own mining industries, usually by means of drastic tax reliefs.

"The latest adherent to this enlightened and progressive policy is Eire, where an unprecedented revival of base metal mining is taking place as the direct consequence of the tax concessions granted two years ago. The British Government, however, appears to be blissfully unaware of what is taking place in the sphere of metals, and it fails to see any reason for encouraging the home production of metals, which would be synonymous with the creation of real new wealth within the country."

The report recalls that, when winding up for the government at the conclusion of the debate last June, the then Chancellor said that the types of tax concession which had been proposed to assist the home mining industry (such as have already been granted in the U.S., Canada, Eire, and elsewhere), were quite contrary to our "tradition" and could not be accepted.

After expressing astonishment at such an attitude on the part of the government, more especially having regard to the continuing seriousness of Britain's financial difficulties, the Executive Committee assumes as "the only possible inference", that, in the view of the Treasury, the maintenance of a taxation "tradition" is more important than the welfare of the country's trade and industry.

"After nine years of fruitless effort, this Association has been forced to conclude that, as far as the home production of non-ferrous metallic minerals is concerned, Westminster and the Treasury are impervious either to reason or expert advice, and are quite unwilling to profit by the example set by other and more far-seeing governments," states the report.

The remedy, it is suggested, lies in so arousing public opinion that the government can no longer ignore the matter with impunity. The creation of an active public interest in metals will require expert and sustained publicity and this will, admittedly, entail a

good deal of money. Nevertheless, as other industries have proved, good public relations are frequently very necessary and profitable and the mining industry, too, badly needs to formulate and educate public opinion. If it fails to do so, it will only have itself to blame for the continued stagnation of mineral development within Britain.

Since it seems unlikely that the few surviving mining companies scattered throughout the country have sufficient funds to undertake the public education that is required, the Executive Committee consider it essential for this task to be undertaken, at least in its initial stages, by the large mining houses that have been showing interest recently in the development of Britain's minerals. "If these firms seriously believe that metalliferous mining still offers scope for capital and enterprise in the United Kingdom, then it is clearly in their interest to create that climate of public interest which is essential for the industry's survival".

The effectiveness of good public relations as a means of influencing both public opinion and government policy has been convincingly demonstrated by experience in other industries. In its long struggle to obtain a better deal for home mining, the Association has adopted a realistic and, in fact, the only possible approach. It should be considerably strengthened by its closer link with the United Kingdom Metal Mining Association, whose own long battle for tax concessions has at last met with success.

FINANCE FOR INDIA'S HEAVY INDUSTRY

British and Soviet interests share a major role in the proposals announced here for the development of India's heavy machinery industry. Large Soviet and British credits are envisaged in financing the project and India has already accepted a Soviet offer of credit financing, amounting to Rs.600,000,000. Talks on British participation are in progress in London.

The Indian Government has announced its decision that heavy structural fabricating works, ship-plate and heavy machine tool plants "should be established as recommended by the recent U.K. heavy engineering mission".

Suitable credit terms for these projects were discussed with Sir Norman Kipping, Director-General of the Federation of British Industries, when he was in New Delhi recently, and further talks are now taking place in London. In making this announcement, the Indian Government stated that, from the talks with Sir Norman, it appeared that British industrial interests would be willing to collaborate in setting up these units. It was also understood that Colombo Plan assistance for technical and consultative services was likely to be available.

While the form of British credits is not given, it is known that India's general import policy would favour a 10 per cent payment on signature of the contract, the remainder of the amount deferred until such time as the project is in production and earning foreign exchange.

It was further announced that India had accepted the recommendation of a Soviet team of experts for setting up a central heavy machine-building plant. Soviet experts envisaged that the plant would have a capacity of 80,000 tons of machinery and equipment a year.

The Soviet Union had offered Rs.600,000,000 credit, which the Indian Government had accepted, and part of this would be used for the establishment of the plant.

The overall development will cost between Rs.800,000,000 and Rs.900,000,000, of which Rs.500,000,000 will be the foreign exchange component.

The whole scheme provides for seven main divisions, one of which will be a mining machinery and equipment plant.

It is noteworthy that British interests are already closely associated with the establishment of a heavy electrical manufacturing industry in India through Associated Electrical Industries. It will also be recalled that last year leading U.K. firms concluded arrangements for the formation of a company to build a heavy engineering works in West Bengal. A consortium of British firms is building one of the three steel plants under construction for the Indian government. In the chemical field I.C.I. is participating in three big development projects, including a £3,000,000 explosives plant, and has also been assisting the Indian Government in other directions.

Thus the U.K. is assured of substantial participation in the implementation of India's second Five-Year Plan.

It is understood that several more projects are contemplated by the Indian Government under the credit offered by Russia. They include the development of the Korba coalfield, involving the supply of the necessary mining equipment; the erection of a thermal plant at Neiveli (South India) as part of the lignite scheme; the manufacture of methanol, as well as the production of optical glass.

CHALLENGE TO NEW SOUTH WALES COAL

The year 1955-56 was probably the most difficult year the coal industry in New South Wales has had to face since the commencement of the Second World War. At the beginning of the year, the industry had a capacity to produce in excess of the available market and this position was aggravated by steadily increasing competition from other fuels as the year progressed.

The large oil-refining installations which were constructed more or less simultaneously in New South Wales, Victoria and Western Australia, were all in production during the year and released on to the Australian market substantial quantities of fuel which, in the form of refinery gases and residual oil, were competitive with coal. The year also marked the commencement of the supply of power in fair quantities from the Snowy Mountains scheme and, due to seasonal conditions, the hydro-power drawn from other sources in New South Wales increased.

As a consequence of the loss of markets on the one hand and increased supplies of hydro-power on the other, the consumption of New South Wales coal throughout Australia declined to the extent of some 445,000 tons. This was the first occasion for many years in which the actual consumption fell, although the growth of the productive capacity of the industry has been restricted gradually ever since the coal shortage was overcome in 1952.

The total production of coal from underground mines and open cuts in New South Wales during 1955-56 was 14,554,000 tons, 45,000 tons less than for the previous year. However, the underground production for 1955-56 was a record, being 201,000 tons higher than the previous record of 13,498,000 tons from the underground mines in 1954-55. The open cut production for the year was 855,000 tons, a decrease of 246,000 tons as compared with 1954-55 and a decrease of 1,810,000 tons as against the record open cut production of 2,665,000 tons in 1951-52.

Consumption of New South Wales coal within Australia was 13,909,000 tons. This represents a decline of 445,000 tons or 3 per cent compared with 1954-55. Consumption in New South Wales fell by 163,000 tons—the first decline since 1949 when production and consumption of coal were affected by a prolonged general strike. While the consumption decline in New South Wales for the year 1955-56 was slight in proportion to the total market, it was more

severe in other States of Australia. The drop of 281,000 tons in other States compared with 1954-55 represented a decline of 12 per cent compared with a total decline of 10 per cent over the preceding four years.

Overseas exports at 204,000 tons for 1955-56 were lower by 77,000 tons than for the previous year and, apart from regular consignments to the Pacific Islands, contracts were difficult to obtain. The high freight and handling costs make competitive tendering in distant markets almost impossible.

Side by side with the falling off in demand, there was a noticeable increase in efficiency. Many schemes of mine reorganization came to fruition during the year and mines which were less efficient, or were unable to produce coal of quality demanded by the market, were forced to restrict their production or, in some cases, to close down. The result of these interacting forces was to reduce the manpower requirements of the industry and, at the end of June, 1956, the number of employees was roughly 1,500 less than the number working in the industry twelve months earlier. Fortunately, it was possible to find work for all the men who were displaced either by their transfer between mines or by their engagement in other industries.

Coal quality was further improved either by the elimination of poor quality producing mines or by the physical treatment of the coal won at certain mines. The price of coal was also reduced fractionally. Every possible effort was made to develop an export trade and some orders were received. As pointed out by the Joint Coal Board, however, in its annual report for 1955-56, it is evident that the future of the industry rests on the consumption of coal in Australia and predominantly on the rate of development of the State of New South Wales.

At the end of the year, the industry as a whole was in a stronger position to meet the requirements of the market. At the same time, a number of the older mines must be reorganized if their current rate of production is to be sustained. It is evident that the trend will be toward the closing down of unpayable mines, and those which cannot be mechanized economically. Mechanization has now reached a high level and enhanced efficiency is being felt throughout the industry. But the markets that have been lost cannot be recovered. Cost of coal is falling, however, and now that the disastrous effect of union policy is realized, there has been industrial peace for over two years. With its continuation, it is hoped that the industry may hold its ground in the face of increasing competition from other fuels.

U.S. MINES MORE DANGEROUS

The U.S. Bureau of Mines reports that 443 mineworkers died last year in the nation's coal mines and that an estimated 19,300 were injured. The number of fatalities was 26 more than in the previous year. These are alarming figures and suggest that the high O.M.S. in the U.S. coal mines is being paid for by an excessive accident rate. The Bureau of Mines director, Marling J. Ankeny, has called for greater vigilance on the part of employers and employees in an attempt to combat this rising trend in mining fatalities.

Bituminous operations last year accounted for 388 deaths whilst 55 anthracite miners were killed. Falls of roof and sides were responsible for more than half the year's toll and accounted for 244 of the fatalities. Killer No. 2 was haulage mishaps, 99 lives being lost—77 underground, 12 surface, and 10 at strip mines.

For the first time since nationalization, Britain's coal industry is rather embarrassed by a surfeit of coal. Production so far this year is almost 2,500,000 tons up on last year's figures and this, coupled with a mild winter and a big reduction in the tonnage of coal exported, has resulted in stocks being at an all-time high level. However, this situation is a welcome one—to all except those engaged in marketing the coal—and provides a glimmer of hope that if this rise in productivity can be maintained the N.C.B. can, in fact, produce the estimated 20,000,000 tons additional coal required by 1965.

MINING EXPANSION IN MOROCCO

All previous records were broken last year with a total production of 1,378,318 tonnes of iron ore in the northern (former Spanish) zone of Morocco.

Figures published by the Government's Mines Service in Rabat also show that exports of this commodity were higher than ever before and actually exceeded production by more than 10,000 tonnes. Out of the total of 1,389,955 tonnes exported in 1956, Western Germany took 589,000 tonnes, Spain 289,184 tonnes, Great Britain 280,234 tonnes, the Netherlands 133,168 tonnes and France purchased 98,369 tonnes.

Combined production of iron ore in the northern and southern zones of Morocco last year was 1,868,008 tonnes, whilst total exports amounted to 1,856,961 tonnes.

Other minerals produced in the northern zone last year included lead ore (1,215 tonnes), antimony ore (593 tonnes), manganese ore (865 tonnes), graphite (125 tonnes) and bentonite (895 tonnes).

STEEL IN THE ASCENDANT

The American steel market has lost some of its earlier ebullition. Buying has been on a reduced scale and the downward trend in steel operations which began in February has not yet been reversed. Production is now down to about 90 per cent of theoretical capacity.

Yet the industry is not unduly perturbed. In some measure restraints on the part of buyers is attributed to inventory reductions, and if hopes for a possible record-breaking steel output this year have been somewhat dimmed, American producers remain confident that a pick-up in the motor industry will be the starting point of a quick recovery.

Elsewhere there has been no check to the boom in steel. World demand has been swollen by huge capital investment projects, the continuing pressure for ship-building steel, the vast projects for the construction of new oil and gas pipe lines, and the extensive atomic power programmes.

West German crude steel output, which reached the record post-war total of 23,200,000 tons last year, is expected to rise to 29,000,000 tons in 1960, and expansion of British production is planned on a no less ambitious scale.

The Australian announcement of an increase of £A11,000,000 in the annual level of motor imports is an indication of the expansion of the export market for British steel. Sales to the U.S. are at record heights and as there has also been a brisk revival in the home market the motor industry has given notice to the Board of Trade that its demand for sheet steel will outrun the capacity of the U.K. mills in the third quarter of the current year.

But full employment for the existing sheet mills and also for the new capacity which will shortly be available at Shotton and in South Wales seems to be assured.

Gold Mining

By G. Keith Allen, B.M.E.

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GHANA is the former British Dependency of the Gold Coast, which achieved Dominion status on March 6, 1957. This day was the 113th anniversary of the signing of the Bond between the British Government and certain chiefs from which British authority in the country was derived, and the name Ghana is that of an ancient African empire from which it is supposed by some historians the Gold Coast peoples had their origins.

Ghana lies entirely within the tropics, extending from 3 deg. 15 min. W to 1 deg. 12 min. E longitude, and from 4 deg. 45 min. to 11 deg. N latitude, and includes the old Administrative Areas of the Gold Coast Colony, Ashanti, Northern Territories, and Togoland under British Mandate. It covers an area of about 92,000 square miles, which is only a little smaller than that of Great Britain. The total population is approximately 4,500,000 Africans and 13,000 other races; some 25,000 Africans and 800 British are employed in the gold mines. The only mining of more than transient importance has been confined to the two Administrative Areas of the "Colony" and "Ashanti".

Early History

Although it is known that the Carthaginians and the Phoenicians sailed round the west coast of Africa in the 5th and 6th centuries B.C., there is no record of their reaching the Gold Coast, and it was not until the 10th century A.D. when the Saracens, coming overland, penetrated the Sahara desert and established a trading post at Melli, south of the Niger River, that gold became a regular article of commerce in the overland trade between the territories bordering the Gulf of Guinea and the Mediterranean countries.

The first authentic record of gold being obtained from the Gold Coast dates from 1471, when the Portuguese started trading in gold dust at the mouth of the Pra River. Eleven years later, in 1482, they built 20 miles further east their great fortress of Elmina. It was constructed of timber and stone already cut and dressed in Portugal, and it stands today, much enlarged and used for more peaceful purposes than when first erected, a monument to early Portuguese enterprise.

During the 15th and 16th centuries, the trade in gold was brisk, but it fell away with the advent of the slave trade in the 18th century and did not recover until slavery was abolished early in the 19th century.

Junner estimates exports of gold by sea from the Gold Coast from 1471 to 1880, when official figures first became available, as follows:

Period	*Average Annual Exports (crude oz.)*	*Total (crude oz.)*
1471 - 1750 (280 years) ...	40,000	11,200,000
1751 - 1800 (50 years) ...	10,000	500,000
1801 - 1850 (50 years) ...	40,000	2,000,000
1851 - 1880 (30 years) ...	25,000	750,000
(410 years)	Total ...	14,450,000

From 1880 to 1955/56 (76 years), according to the latest available figures, the total gold production was 22,257,237 oz.

When the Portuguese arrived in 1471, all the gold traded by the Africans was won from stream and beach sands, and it was not until early in the 18th century that the Africans began working auriferous lodes as well as alluvial deposits.

The lode workings consisted of closely spaced pits of 2 - 3 ft. dia. sunk in the soft weathered outcrops. Since the Africans were unable to cope with water or hard rock, the pits were stopped when these were encountered.

These old surface workings are a common feature of all the lode mines and are absent only when the gold in the deposit is so fine or so intimately associated with sulphide minerals that it is not visible or recoverable by simple gravity concentration. In the banket reef areas where active pitting is extensive, it seems certain that the lodes worked were soft haematitic sandstones and that the gold-bearing conglomerates were not found until cut by adits when the first Europeans started operations there about 1878.

In this year a French trader and explorer, Monsieur Pierre Bonnat, and others, including Dr. A. Horton, of Cape Coast, and a Major-General Wray, obtained concessions from the local chiefs in the Tarkwa area. Two years later Bonnat formed the first company to work the banket reefs of the country. He died in 1882, is buried at Tarkwa, and is rightly called the father of modern mining in the Gold Coast.

Bonnat's venture in Tarkwa was not his first attempt at gold mining in the Gold Coast. He was first heard of trading in arms and ammunition among the Ashantis in the 1860's (here I draw freely from an account left by the late T. J. Forster, Secretary of Taquah and Abosso Mines). As Claridge in his "History of the Gold Coast" puts it: "Bonnat stayed behind to sell arms and powder to the Ashantis. They, however, took them for nothing and him also".

They kept him for four and a half years in Kumasi and he was, in fact, one of the celebrated "Captives of Coomassie" that Sir Garnet Wolseley's expedition of 1873/74 was to liberate. After the burning of "Coomassie" and the return of the expedition, Bonnat opened a trading store at Axim at the mouth of the Ankobra, where he discovered that the local supplies of gold dust came from diving operations in the river. About 1876 he went to Paris and lectured before the Paris Geographical Society on his explorations and adventures, and spoke of the possibilities of the Gold Coast as a gold field.

A French mining engineer, Monsieur Albert Verillon, happened to be present. He was interested in a "Patent Suction Dredger for Sand", the invention of a Monsieur Bazin. They formed a "Participation" to exploit the Ankobra River; Verillon provided an office; Bonnat, partly from his own family but mainly through his English Army-officer friends, secured funds; and Bazin undertook to invent anything and everything that could possibly be wanted.

The "First Expedition", led by Bonnat, left Liverpool in March, 1877, taking with them Bazin's inventions, a "Sand Pipette" and a "Gold Washer". The former was to be sunk into the sand, which was then to be pumped through it and passed to the washer. Unfortunately, the

washer never had a chance to display its capabilities. Essential parts of it were lost when a canoe overturned; and in any case the river bed was found to consist of gravel and stones and the "Pipette" could not function.

Undismayed by this failure, a "Second Expedition", led by Major General Wray, left Liverpool late in 1877, taking with them diving suits. This venture met with no more success than the first one, but tales reaching the party of rich gold finds in Tarkwa, caused Bonnat and Wray to abandon the Ankobra and make their way to that centre. Thus, the first serious attempt at alluvial mining ended and lode mining in the Gold Coast began.

Geology

Broadly speaking, the lode mines are of two types: those of (a) the quartz reefs and (b) the banket reefs.

(a) The quart reefs occur in steeply dipping pre-Cambrian greenstones and schists known as the Birrimian series, with a general north-easterly strike. The orebodies are in the form of lenses up to 1,500 ft. long and usually from about 4 to 30 ft. in width, although widths up to 170 ft. have been

in Ghana

reported. They generally cut across the bedding and foliations of the enclosing rock at an acute angle, and dips mostly exceed 55 deg. always West, except at Bibiani where the prevailing dip is East. A large proportion of the gold occurs as fine particles, closely associated with sulphide minerals such as pyrite and arsenopyrite; but coarse particles of free gold visible to the naked eye are also a common characteristic of these reefs.

There also occur orebodies consisting of lenses of dike, tuff and schist heavily impregnated with arsenopyrite and pyrite, and traversed by veinlets of quartz. Justice, Sansu, and Old Chief Mines at Obuasi are examples of these, and the oxidized surface deposits worked by Marlu are related.

(b) The banket reefs occur in a series of predominantly arenaceous rocks, also of pre-Cambrian age, known as Tarkwaian. This series succeeds the Birrimian and with it forms part of a geosyncline stretching in a north-easterly direction from the coast at Axim to beyond Konongo, a distance of some 150 miles, where it is covered by sedimentary formations known as Voltaian. The reefs vary in thickness from a few inches to several feet and conform to the strike and dip of the country rock. The banket mines of the Tarkwa area are located mainly on the eastern limb of the syncline, dips vary from vertical to horizontal, and duplication of the reefs due to strike faulting is common.

Modern History

The development of modern mining in the Gold Coast can be divided into three periods:

First period from 1880 to 1901. This was the pioneering period—one of high hopes and great endeavour, dogged by unrelieved tragedy of sickness and death from yellow fever, blackwater fever, malaria and other tropical diseases.

McCarthy records that four years after leaving the Coast in 1882 only four of some 44 or 45 who were there at the same time as he were still alive. The vicissitudes of life in West Africa had killed the rest. It is hardly surprising that the country became known as "The White Man's Grave"—a sinister reputation still persisting less than 25 years ago.

This is the first part of Mr. Keith Allen's presidential address to the Institution of Mining and Metallurgy on May 16, and has been abridged. Further extracts will be published in subsequent issues.

There were no roads or railway, and machinery had to be made in sections light enough to be carried on the heads of porters from the nearest river or sea ports to the mines. The cost of transport was high, up to £30 per ton to Tarkwa being normal, where the carry from the Bonsah River stage was about 22 miles.

The concessions originally granted to Bonnat eventually were worked by Taquah and Abosso Mines Ltd., while those of Dr. Horton and others are now being developed by Amalgamated Banket Areas Ltd.

The first concessions of the Bibiani mine were granted in 1891, and the Ashanti Goldfields Corporation started working the rich reefs at Obuasi in 1897.

At Prestea there was one company at work in 1885, and another shortly afterwards, on ground that is now being mined by Ariston Gold Mines.

Konongo and Gold Coast Main Reef (now Ghana Main Reef) companies work concessions that were not granted until after the turn of the century.

Second period 1901 - 1931. The railway from Sekondi reached Tarkwa in 1901, Obuasi in 1903 and Prestea in 1910. In 1897 some engineers from the Transvaal had visited the Tarkwa goldfield and declared the reefs there were similar to and of equal or higher grade than the Johannesburg deposits. These reports awakened a widespread interest in the field, and with (a) the coming of the railway, (b) the ending of the Ashanti war in March, 1901, and (c) the Boer War in South Africa leading to a diversion of capital from that country, a tremendous boom in gold mining in the Gold Coast began. This was the famous Jungle Boom of 1901/02.

Over 400 mining companies were formed, and although the majority of them never carried out mining operations, large-scale equipment of mines took place and intensive prospecting and exploration of the gold areas commenced.

In 1913, the Gold Coast Geological Survey was formed and began a mineral and geological survey that was to prove of immense benefit to the mining industry and to the country. By 1922, the Survey had discovered the valuable manganese, bauxite and diamond deposits, and by 1925 had commenced detailed mapping of the principal goldfields of the country. Practically all the exploration carried out by the companies since then has been based on the Survey's work, with much assistance from its officers.

Despite all the activity of this period, however, the only new gold discovery of lasting importance made was the Justice Mine in 1907 at Obuasi. This had escaped notice on account of the gold being locked up in sulphides and thus not being detectable by panning. Nevertheless, in this period, gold production soared. In 1901, immediately prior to the boom, it amounted to only 5,223 oz.; by 1914 it had reached over 400,000 oz. per annum, but it fell thereafter owing to the war and the slump that followed. At the end of the period, in 1931, production was less than 250,000 oz. per annum, and only four companies were producing gold.

(*To be continued*)

THE estimated world production of slab-zinc in 1957 should reach the new record total of about 3,141,000 s.tons—an increase of 59,000 tons or 2 per cent over the 1956 output. Smelter production of lead in 1957 is expected to be about 2,328,000 s.tons—an increase of 27,000 tons or slightly more than 1 per cent.

There have been some changes in the geographical distribution of world zinc and lead production during the past ten years. Immediately after World War II, the principal slab-zinc-producing countries other than the U.S., listed in order of importance, included Canada, U.S.S.R., Belgium, Austria, the U.K., Poland, Mexico and France, whose production in 1946 comprised 84 per cent of the total output outside the U.S.

The World's

The U.S.S.R. is now second to the U.S. as the largest producing country, followed by Canada, Belgium, West Germany, Poland, Japan, France and Australia.

A decade ago the principal lead-producing countries—again outside the U.S.—were Canada, Australia, Mexico, the U.S.S.R., Peru, Yugoslavia, Spain and France. The total output of these eight countries comprised 81 per cent of the lead produced outside the U.S.

Currently, Australia is the second largest lead-producing country, followed by the U.S.S.R., Mexico, Canada, West Germany, Belgium, Yugoslavia and France. In 1956 these countries supplied 72 per cent of production outside the U.S.

Let us now consider the estimated output of these and other less important zinc- and lead-producing countries.

Russian Output

Russian zinc-metal production in 1957 is estimated at about 330,000 s.tons. Presumably a substantial portion of the zinc-concentrate output will come from resources within the Soviet Union, probably largely from Central Asian States. Considerable quantities will continue to come from Poland, however, as well as from East Germany. Installed smelting capacity is believed to be adequate to handle increased mine outputs of zinc and lead, resulting from new discoveries in Bulgaria and Central Asia. Development of several million tons of lead-zinc ore, averaging 15 per cent combined metal content, in Bulgaria will add to the increased Soviet metal output, and will also assist in maintaining or perhaps expanding the Polish metal output. Smelting capacity in Bulgaria is quite limited, and most of the concentrates produced are shipped to Soviet smelters or to Polish smelters for Soviet account.

It is anticipated that zinc and lead supplies in the Soviet sphere will be ample to meet internal requirements, as well as yielding a limited supply for export should conditions appear favourable to the Soviets. Self-sufficiency without regard to production costs can be presumed to be a paramount objective of the U.S.S.R.

Now that we have dealt first with the phase of the subject about which least is known, let us move on to the important zinc- and lead-producing countries in the rest of the world.

Australia and Canada

Australia has been one of the world's leading sources of lead and zinc for many years. Slab-zinc production in Australia is limited to the output of the electrolytic zinc plant at Risdon, Tasmania, which has an annual productive capacity of about 119,000 s.tons. In 1956, this plant produced 117,000 s.tons of slab zinc. It is estimated that production in 1957 will remain relatively unchanged.

MINE PRODUCTION OF LEAD

(000's l.tons)

	1954	1955	1956
U.S.A.*	283	302	311
Australia	280	296	296
Mexico*	214	207	200
Canada*	197	173	167
Peru	108	114	124
Yugoslavia	82	89	90
French Morocco	68	88	86
South-West Africa	80	81	83
Germany (Fed. Rep.)	66	66	64
U.S.S.R. (est.)	275	290	300
Others (est.)	375	384	449
World Total (est.)	2,028	2,090	2,170

* Estimated recoverable.

Supplies

The two Canadian zinc smelters at Trail, B.C., and Flin Flon, Man., produced 256,000 s.tons of slab-zinc in 1956—slightly less than the all-time record of 257,000 tons recovered in 1955. The annual capacity for slab-zinc production at these two plants is approximately 261,000 s.tons. With continued high-level output of zinc concentrates resulting from recent zinc-lead discoveries and developments, it is considered that slab-zinc output will be maintained at virtually the same level as in 1956. In recent months Canadian lead-zinc metal output has been averaging 13,000 s.tons. Maintenance of this rate throughout the year will put the Dominion's lead output for 1957 at 156,000 tons—no record production, but an impressive gain over 1956.

The significance of new zinc-lead discoveries and developments in Canada is becoming increasingly apparent. In the New Brunswick area the Heath Steele mine and 1,500-ton-per-day mill are in production. The copper circuit was put in operation in January and the lead-zinc circuit a few weeks later. The latter at capacity operation will produce approximately 24,000 tons of recoverable zinc and 12,000 tons of recoverable lead annually. Shipments of concentrates will probably await completion of a 22-mile railway later this year.

New Brunswick Mining and Smelting Co. continues to develop its property and is working towards an economic solution of the complex metallurgy involved. It is understood that programming of production will be undertaken shortly.

At present the New Brunswick area reserves, totally unknown five years ago, are estimated to contain 7,000,000 tons of zinc and 2,800,000 tons of lead, plus substantial quantities of copper and silver in the 128,000,000 tons of ore indicated, largely within the 1,000 ft. nearest to the surface.

The development of the Pine Point Mines Ltd. property in the North-West Territories has continued. It now appears that reserves are about 100,000,000 tons containing about 2,000,000 tons of lead and over twice that quan-

This article is condensed from a paper presented by Richard H. Mote, Chief, Branch Base Metals, Division of Minerals, U.S. Bureau of Mines, before a joint meeting of the Lead Industries Association and American Zinc Institute, Chicago, on April 25.

tity of zinc. The remoteness of the property prevents immediate production, but unquestionably when transportation facilities become available this area will become productive.

Europe and South America

Except for periods during the first and second world wars, Belgium has always played an important role in the international zinc and lead scene. Although there are some lead-zinc deposits in Belgium, all metal produced at present is derived from imported ores. Based on the current rate of slab-zinc output (which is about 21,300 s.tons a month), it seems reasonable to assume that Belgian smelters will produce approximately 256,000 s.tons of metal in 1957.

Germany and Belgium together produced over half the zinc metal smelted in Europe, plus a substantial portion of lead. In Germany about 70 per cent of the concentrates smelted are of domestic origin. German smelters will produce 215,000 s.tons of slab zinc and 130,000 tons of lead in 1957.

The long-term zinc programme of the Cerro de Pasco Corporation in Peru has resulted in expanded zinc output

# of Lead

and increased production potentials in that country. Recent completion of the Paucartambo River hydro-electric plant will enable the company to expand zinc output at its La Groya electrolytic smelter from a current daily rate of 120 tons a day to 150 tons by the end of this year. Thereafter, production will gradually be increased to 240 tons per day or 87,000 tons of slab zinc per year.

On the basis of this information, it is estimated that slab-zinc output in Peru in 1957 will be approximately 35,000 s.tons.

United States

Based on the current rate of domestic mine production, it is estimated that the U.S. slab-zinc output will reach a new record total of 1,000,000 s.tons in 1957. Smelter output of lead in the same year is estimated at 550,000 s.tons.

In the U.S. many new mines are being developed; these will contribute to expanded supply of zinc and lead. Among those in the Eastern U.S. are the New Jersey Zinc Co., Friedensville, Pa., property, which is scheduled to begin production late in 1958 with an annual output of approximately 78,000 tons of zinc concentrate; approximately 40,000 tons of this will be recoverable zinc. New Jersey's Ogdensburg, N.J., property has an anticipated annual capacity for 300,000 tons of crude ore, indicating a large increase in output of recoverable zinc.

The significance of Tennessee as a future source of zinc is emphasized by a recent statement of the American Zinc Co. that the South-West New Market DMEA project in Tennessee has indicated approximately 26,000,000 tons of zinc ore in four major areas and 10,000,000 tons in smaller orebodies. The reserve, in terms of concentrate, is 2,000,000 tons of 60 per cent zinc concentrate or approximately 1,000,000 tons of recoverable zinc. The American Zinc Co. has stated further that its other reserves in Eastern Tennessee are of about the same magnitude, making a total of roughly 2,000,000 tons of recoverable zinc.

Lead production in the Central U.S. remains at a relatively constant level, with St. Joseph Lead Co., operator of the principal mines in the South-East Missouri's lead belt, developing new properties at a consistent rate to maintain output at about 120,000 tons of recoverable lead annually.

In the Western U.S. developments will also lead to new sources of zinc output. In Arizona, Pima Mining Co. is constructing a new plant to produce 30,000 tons of copper and 4,000 tons of zinc annually. However, the big development in the West—the one that really suggests a considerable potential—is that of the Anaconda Co. at Butte, Mont. The underground North-West project, which involves sinking of the Ryan and Missoula shafts and development of numerous copper-zinc veins north of the Anselmo and west of the Lexington and Mountain Con mines, will ultimately add 15,000 tons of ore to the daily total now being processed.

The Outlook

The progress of mine production of lead and zinc in the principal producing countries can be seen from the accompanying tables, which are in l.tons.

In the light of the existing data, it seems reasonable to conclude that supplies of lead and zinc are adequate to meet all foreseeable needs, assuming a free flow in the normal channels of trade, such as now exists. There is strong evidence at this time that the world output of both metals will go on exceeding consumption during 1957, and that the stockpiling programme of the U.S. government and the barter transactions of the Department of Agriculture will continue to be important elements in the market balance.

and Zinc

The significance of secondary production must not be overlooked. The latest annual figures for 1956 show that 60 per cent of the U.S. domestic supply was secondary lead and 40 per cent from mine production.

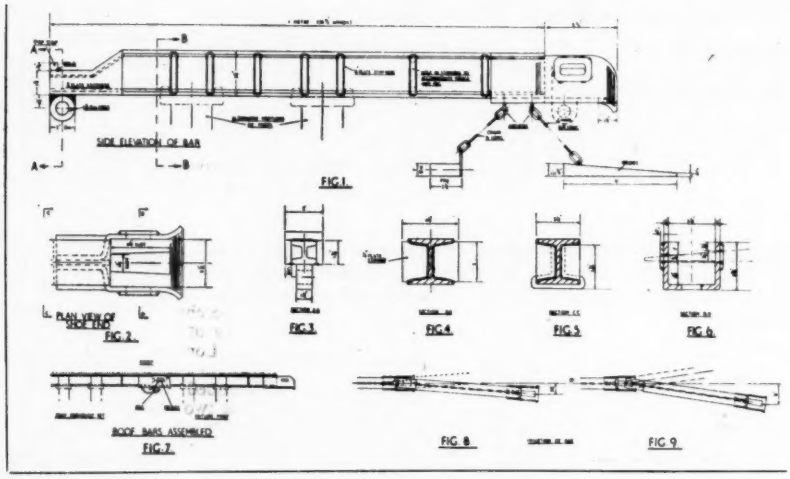
MINE PRODUCTION OF ZINC

(000's l.tons)

	1954	1955	1956
U.S.A.*	415	460	491
Canada*	334	381	390
Australia	225	257	285
Mexico	220	265	225
Peru*	125	170	170
Germany (Fed. Rep.)	117	91	92
Poland (est.)	139	154	150
Japan	107	107	120
Italy	101	104	110
U.S.S.R. (est. smelter)	240	255	255
Others (est.)	537	526	612
	2,560	2,770	2,900

* Estimated recoverable.

New Designs for Colliery Equipment



IT is, of course, axiomatic that progress in the field of mining equipment depends not only on the investigations of research workers, but equally on the skill and knowledge of technical experts. Visitors to new or reorganized collieries are frequently impressed by the extent to which the National Coal Board, in its programme of reconstruction, has been able to incorporate improvements designed or suggested by the men on the spot.

Two recent examples of equipment designed by N.C.B. staff are illustrated in the accompanying drawings.

The automatic axle stop is the design of Mr. A. Thomas, senior draughtsman in the Swansea Area. In contrast to the many types of stops in use, it is accommodated, with its linkage, within the cage floor, and can be arranged to operate automatically for either direction of tram movement at the top or bottom of the shaft.

Its operation depends on the provision of fixed or retractable arms arranged to arrest the hanging link "A" as the cage is lowered into its decking position. These arms would be operated by the kep gear where it is provided, or a fixed stop in the case of a shaft bottom with no keps.

The system of operation is that the hanging link "A" is raised vertically as it comes into contact with the retractable arm when the cage comes to rest. The raising of "A" lowers the scotch "B", allowing the tram in the cage to be pushed out by the incoming tram. The scotch "C" is depressed by the front axle of the incoming tram; this lifts the link "D", and actuates the cam "E". This draws back the rod "G", and link "A" to which it is connected. Link "A" is now clear of either the kep or the formed recess in the bumping baulk, and drops under its own weight, causing scotch "B" to return to its normal position to receive the incoming tram.

If trams enter the same end of the cage at both top and bottom, a single arrangement is fitted on the centre line of the cage. To cater for systems in which trams enter the cage at opposite ends at the pit top and bottom, duplicate sets of linkages can be installed, fitted in reverse and alongside. Clearance is then provided in the bumping baulks, as shown in the illustration, to accommodate the unrequired hanging lever "A" on the outgoing side of the case.

The linked roof bar illustrated is the design of Mr. G. A. Priestley, manager of Mossfield colliery in the West Midlands Division.

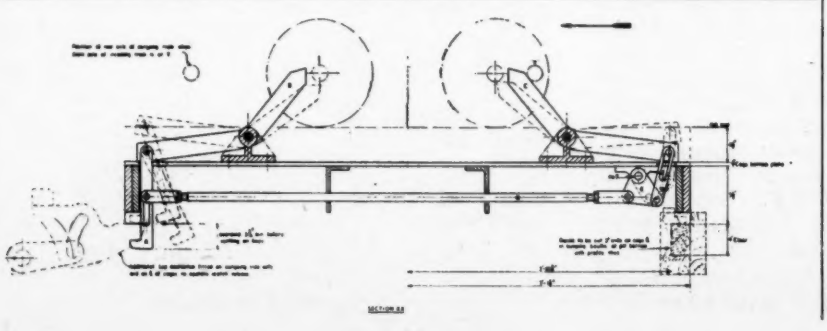
The bar consists of a rolled steel joist which has strengthening members welded between the flanges to strengthen the bar and to provide prop locating positions. At one end of the bar is a bell-mouthed receiving shoe of cast steel, and at the other end is an insertion portion with a lug adapted to pass through a slot in the base of the receiving shoe of a bar which has previously been set in position. A cotter pin driven through the lug completes the link.

The receiving shoe has two sides and a base, the top being open. Both sides are slotted to accept a wedge which is tapered on one side only. The purpose of the wedge is to force the bar to the roof of the seam and to support the bar in cantilever until the prop is set.

At the insertion end of the bar the top web is lowered to correspond with the wedge holes in the receiver. A stop strip is welded along the top edge at the end of the bar to prevent the bar moving under the wedge and to provide an additional link so long as the wedge is in position.

This design provides sufficient tolerance for a lateral movement of 3½ inches on each side of the bar. The bar extending process can be speeded up because the bar can enter the mouth of the receiver at almost any angle.

Other advantages claimed for the design are that the weight of the bar is taken off the man immediately it is rested on the receiver, and that extensions can be carried out easily by one man.



Above: Priestley's Linked Roof Bar

Left: Automatic Cage Floor Axle Stop

MINING MISCELLANY

Finland is planning a considerable increase of its pig iron exports to Japan, which so far have been of little importance.

★

The Magundi Chrome Mine in Southern Rhodesia. which suspended production two years ago, is now producing chrome ore again.

★

The Transfer Office of The South West Africa Company, Limited, is removing on Monday, May 20, to the offices of New Consolidated Gold Fields Limited, 49 Moorgate, London, E.C.2.

★

The first shipment of copper ore from the Mtuga Mine, reopened by Sir Roy Welensky in February after being closed down 28 years ago, left early in May. The mine is producing 30 per cent copper concentrate at the rate of about 300 tons a month. This will increase as the teething troubles of the new plant are overcome.

★

The State - owned Hibernia Coalmining Co. has agreed to sell 51 per cent of the DM.30,000,000 share capital of Emscher-Lippe collieries in Germany to the Phönix-Rheinrohr Steel Co. The Emscher-Lippe mines belonged to the Krupp concern, but were sold under the de-concentration agreement in 1954 to the Hibernia Co.

★

Faraday Uranium Mines, which recently made its first shipment of uranium precipitate, is the second uranium mine in the Bancroft area of Canada to reach production. The precipitate was produced only 11 days after ore was first fed into the company's 1,000-ton mill, after an expenditure of $10,000,000.

★

Durham Raw Materials Ltd., 1 - 4 Great Tower Street, London, E.C.3, are now selling-agents for the clays produced by Watts, Blake, Bearne and Co. Ltd., of Newton Abbot, Devon. This agency extends to all industries other than the ceramic and refractory trades. The agreement has the effect of combining the technical resources of the two companies.

★

A group of American and Canadian financiers are reported to be interested in investing 70,000,000 kroner in exploiting large deposits of copper in the Reppar Fjord in Finnmark, northernmost Norway. A mine would be constructed and also a refinery. It is calculated that an annual production of 20,000 tons of copper should be possible. The deposit is at present under Swedish ownership, but has not been worked for over 50 years and never on an extensive scale.

★

The Can-Erin Mining Corporation hopes to start underground mining operations by mid-summer at the Allihies, County Cork, mine, which is being operated by its subsidiary, the Emerald Isle Mining Co. Ltd. Surface plant at the mine has been completed and the main shaft has been drained down to the 1,600 ft. level. Two diamond drills will be in use underground by mid-summer. Exploration work at Allihies began about 12 months ago.

★

It has been announced that the Asea Co. of Vasteras, Sweden, and the Brush Group Ltd., of London, have made an arrangement whereby the latter will acquire the equity of Asea Electric Ltd., of Walthamstow, London, also trading as Fuller Electrical and Manufacturing Co. Ltd. It is intended that the present activities of these two companies, including extensive representation for Asea Sweden in the U.K., will continue exactly as before but under the name of Fuller. Mr. Ian Morrow and Sir George Briggs, directors of the Brush Group, will become chairman and vice-chairman, respectively, of the company. Mr. Nils Plahn will remain managing director and there will be no change in the present management.

★

The establishment of a new associate company based permanently in Central Africa has been announced by Autair Ltd. Its headquarters will be in Northern Rhodesia, with commercial representation in South and East Africa. Its primary function will be the sale and operation of helicopters manufactured by the Bell Helicopter Corporation, who have appointed Autair Helicopters (Africa) Ltd. as their sales representatives in these territories. The first Bell 47 G2 has already arrived in Africa to establish the new organization and after an extensive series of demonstration flights is now engaged on charter work with one of the Rhodesian mining companies. Autair Helicopters (Africa) Ltd. are located at P.O. Box 186, Kalulushi, Northern Rhodesia.

★

Mocatta and Goldsmid has been registered as a private company with a capital of £500,000 to carry on the business of bullion brokers and dealers. This vesting of the business in a company follows its acquisition by Hambros Bank.

PERSONAL

Sir Harold Gillett has been re-elected chairman of the London Chamber of Commerce, Mr. Allen L. Stock deputy-chairman, and Mr. Richard L. Wills treasurer.

★

Mr. Norman Elce, director and chief mechanical engineer, Metropolitan-Vickers Electrical Co. Ltd., has been elected a vice-president of the Institution of Mechanical Engineers .

★

Mr. H. A. Longden has been elected president of the Institution of Mining Engineers for the year 1958-59, and will succeed Mr. E. H. Browne at the annual meeting of the Institution to be held in London on January 30, 1958.

★

The following dates of forthcoming meetings in 1957 have been announced : The Institution of Mining Engineers, Summer Meeting, Newcastle upon Tyne, July 24 - 26; Manchester Geological and Mining Society, Summer Meeting, June 7; The Midland Counties Institution of Engineers, Summer Meeting, June 12; The Mining Institute of Scotland, Glasgow, May 25; The North of England Institute of Mining and Mechanical Engineers, Newcastle upon Tyne, June 13.

★

Mr. H. J. S. French, O.B.E., and Mr. E. F. J. Plumridge have been appointed directors of Barranquilla Investments Ltd. Mr. French was appointed chairman in succession to Mr. D. Robinson, who remains a director.

★

The following awards have been announced by the Council of the Institution of Mining and Metallurgy : The Gold Medal of the Institution for 1956 to Mr. Randolphe William Diamond for his distinguished services to the mineral industry in Canada; " The Consolidated Gold Fields of South Africa, Ltd. " Gold Medal for the Session 1955-56 to Mr. Edward Rich, for his paper entitled " A new process for pneumatic stowing: its development and introduction at the Rio Tinto Mines, Spain " (*Transactions Instn. Min. Metall.* Vol. 65) and " The Consolidated Gold Fields of South Africa, Limited " Premium of Forty Guineas for 1955-56 to Mr. Sydney Charles Newman for his paper entitled " Equipping No. 3 Shaft, Harmony Gold Mining Co., Ltd., Orange Free State " (*Transactions Instn. Min. Metall.* Vol. 65). Honorary membership of the Institution has been conferred on Mr. Sidney Enfield Taylor, the Rt. Hon. the Viscount Falmouth, and Sir Ronald Prain.

CONFERENCE AND EXHIBITIONS

A Festival of Films in the Service of Industry will be held in Harrogate from October 8 - 12 under the presidency of Lord Godber.

★

The Mond Nickel Co. is staging an exhibition featuring the properties of nickel and related materials at the Engineering Centre, Stephenson Place, Birmingham 2, from May 28 - 31. The subjects covered will include corrosion-resistance, surface protection, weldability, high magnetic permeability, permanent magnets, controlled expansion, controlled Curie point, constant modulus of elasticity, and mechanical properties at all temperatures from sub-zero to 900 deg. C. Many of the exhibits take the form of working demonstrations.

CONTRACTS AND TENDERS

The National Coal Development Corp. (Private) Ltd. (a Government of India undertaking) has called for tenders for the supply and installation of crushers, together with screens, hoppers, conveyors, etc., in connection with crushing and conveying quarry debris for underground stowing at Kargali Colliery, P.O. Bermo, District Hazaribagh. The Tender Notice is No. K/Con/Crusher/57. Tenders will be received up to 12 p.m. on 17/6/57 at the office of the National Coal Development Corporation (P) Ltd., Ranchi B.O.T. Ref.: ESB/11202/57. Telephone enquiries to Chancery 4411, extension 738 or 771.

Machinery and Equipment

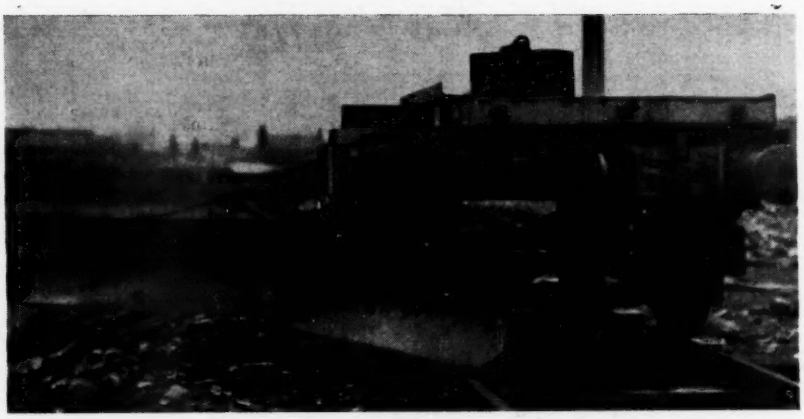
A New Assay Furnace

A novel Globar-type assay furnace has been designed by Royce Electric Furnaces Ltd. The new furnace promises to have many applications in the mining and metallurgical industries and wherever a self-contained source of high-temperature treatment is required.

These assay furnaces are specially designed for fusing and cupellation. The silicon carbide rod resistor heating elements are suitable for service temperatures of up to 1350 deg. C. and they ensure a long operational life for assaying gold at 1050 deg. C. or copper at 1150 deg. C.

A number of similar furnaces have already been supplied to various mines in Canada which are far from central sources of assay, and these have already proved their value as a source of independent operation in remote areas. The furnace is arranged in such a way that it can be broken down into two separate units for shipment.

Electrical ratings for a range of standard sizes are alternatively 9, 12 or 15 kW and overall dimensions are typically 3 ft. 7 in. x 3 ft. x 6 ft. 4½ in.



Above: The Morlais plough wagon

Below: Bray shovel at Sierra Almanzora

When used for assay of gold, this will accommodate a charge of up to 24, 30 gm. crucibles. In the assay process when fusing for gold, the furnace is operated at 1850 deg. F. (1010 deg. C.), the process takes 30-40 minutes, depending upon the individual operator. During the fusion the gold melts-out and amalgamates with the lead to form a lead-gold button at the bottom of the crucible. The crucibles are then removed from the furnace and the second part of the process called "cupellation" can be conducted at 1650 deg. F. (900 deg. C), so that after the crucibles have been withdrawn the furnace door is opened to allow the temperature to drop to this figure. Twenty-four cupels are then put into the furnace and heated up, and subsequently the buttons are placed on the cupels which absorb the lead, leaving the gold sample, a process which takes from 5 to 10 minutes.

When using the furnace for base metal assaying, normally copper, the temperature for fusion is 1950 deg. F. or 1065 deg. C.

BRITISH LOADER IN SPAIN

Overhead Loading Shovels have a perfect application on the narrow winding mountain roads of Sierra Almanzora in Southern Spain. Iron ore is brought from the Peon mine, owned by Mines Hiero Alfomelo, in the mountain range through the tunnels which honeycomb it, out into the winding roads. There, in confined spaces, Bray Dualoaders are loading lorries to transport the ore on a nightmare journey of twisting highways to a port of embarkation. Recipients of the ore include Germany, the Netherlands and Britain.

Reports from Sierra Almanzora indicate that these loading shovels manufactured by W. E. Bray and Co., Ltd., have brought about considerable economies in handling. Where 30 to 40 men were previously employed handling approximately 1,000 tons of ore a day, two Dualoaders are now loading the same tonnage assisted by only three labourers who level material in the lorries.

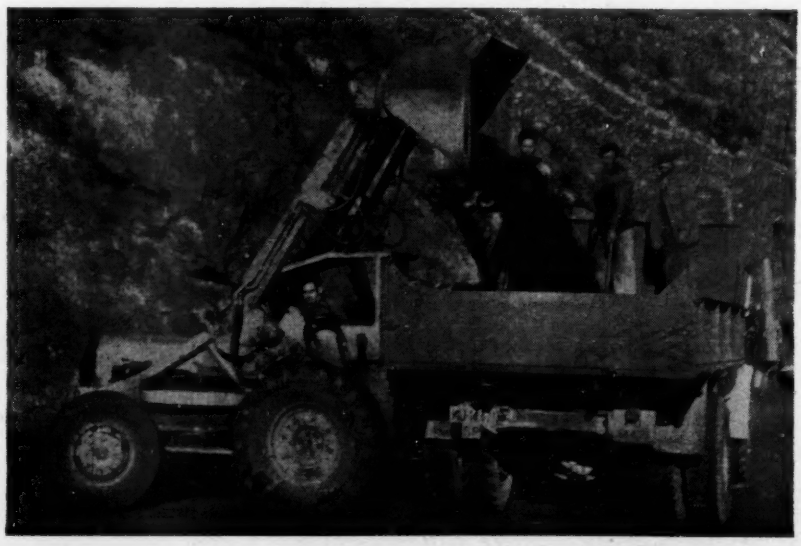
A CLEARER TOOL

To facilitate the removal of rubbish from the railway track at Morlais Colliery, N.C.B., the plough wagon illustrated has been developed. The new machine has obvious potential use at opencast mining sites, in quarries served by rail tracks, at dump areas, and in similar situations.

Rubbish disposal at Morlais is by means of purpose-made side discharge wagons. A railway track runs along the edge of the tip and the wagons discharge over the side from this track. As rubbish is progressively tipped it builds up alongside the track, and the purpose of the wagon is to prevent this rubbish from encroaching on the track.

It is in effect a rail-mounted angle dozer. Around one of the middle bearers of a flat railway wagon a strong channel is constructed suitably braced for ploughing in both directions. On one side of this is bolted a double hinge which can be raised or lowered as required. To this hinge two plough blades are attached. One is bolted to an anchor post and prevents rubbish being pushed on the rail and under the wheel. The other ploughs the rubbish over the edge of the tip, the blade being held in position by a chain wrapped around the leading buffer.

For ploughing in the opposite direction, the two blades are swung on their hinges to the reverse position. If it is desired to plough on the other side of the track, the wagon can be turned around, or a duplicate arrangement made on the far side of the wagon.



Metals and Minerals

The Outlook for Industrial Diamonds

The diamond market enjoyed a record year in 1956, and the sustained heavy demand for gem diamonds continued in excess of the productive capacity of the diamond mining companies.

In his annual statement accompanying the full report of De Beers Consolidated Mines, Sir Ernest Oppenheimer said that, taking everything into account, he viewed the future with much confidence. He recalled, however, that for several years he had warned shareholders that, with the cessation of stockpiling by the U.S. Government, there would be a decrease in the volume of industrial diamonds sold. Since the beginning of 1957, the U.S. has ceased to stockpile industrial diamonds. There has also been a slight decline in sales of industrials. "In view of these two factors," said Sir Ernest, "we must be prepared for smaller sales of industrials in 1957."

The development of industrials as materials of the highest strategic and commercial importance is one of the great research achievements of modern times and represents a contribution of inestimable value to technological progress in numerous fields. While the development of industrials has been in progress for many years, it is now ten years since the establishment of the Diamond Research Laboratory, and Sir Ernest chose this appropriate occasion to examine some of the results achieved. The research programme, he stated, is divided into four fields; the examination of new and improved methods of diamond recovery, the application of diamonds in industry, experimental work on diamond drilling and, finally, the physical properties of diamonds.

The examination of recovery methods by the Laboratory has led to the development of totally new methods, as well as the improvement of existing processes, not only by De Beers in South Africa, but also by producers in the Belgian Congo, Angola, Tanganyika and West Africa. The research in this field continues.

Work done on the application of diamonds to industry has resulted in more efficient use of diamonds, and a consequent wider application of diamond tools. This aim is also being pursued.

So far as experimental work on diamond drilling is concerned, a method has been found of considerably extending the life of a diamond drill bit.

Extensive work has been carried out on the physical properties of diamonds, and to continue this work a high-voltage cascade generator will be installed this year.

Sir Ernest also referred to the manufacture of synthetic diamonds announced last year by the General Electric Company. While congratulating the scientists concerned on a striking scientific achievement, he pointed out that it is too soon to make predictions as to where this achievement might lead. In the field of abrasives, however, it was apparent that further investigation was called for before the synthetic article could compete with the natural one, both as regards cost and quality.

Meanwhile, as emerges very clearly from the chairman's remarks, the diamond industry is certainly not standing still. Doubtless, knowledge gained by the current research programme will be reflected by further gains in the efficiency, economy and scope of diamond tools, thus placing industrials in a still stronger position to meet any potential competition from the synthetic article at a future date.

MANGANESE IN BRITISH GUIANA

Sir Frank Mcdavid, the Member for Agriculture, Lands, Mines and Forests, has told the Legislative Assembly of British Guiana that the Northwest Guiana Mining Co. Ltd. proposes to produce 10,000 tons of ore monthly in 1959, rising to 30,000 tons in 1961. The company is operating in the north-west district, near the Venezuelan border.

The company is to invest $12,000,000 in the project. It plans to construct a 38-mile railway to bring the ore to the point of shipment. While the ore is not of as high a grade as that from traditional sources, it is expected to find economic usage in some manganese alloys and, under present plans, would be used largely in the U.S. by the Union Carbide Corporation.

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Union Carbide and Carbon Corporation is to build an ore preparation plant at Warwick, Virginia, for processing manganese and chromium ores from various parts of the world. The new plant will grade and classify approximately 30,000 tons of ore a month.

AMERICANS AT VOLTA RIVER

Following an announcement by the Ghana Development Secretariat that a group of U.S. companies had been granted Government permission to make a rapid survey of the Volta River project, it is reported that a team of American experts will re-visit Ghana within the next few days to conduct investigations. They are agents of a group which, according to a Secretariat release, "has expressed interest in the practical development of the project as a whole." The firms represented are Foreign Construction Associates, of Houston, Texas; the Utah Construction Co., San Francisco; and Winslow, Cohn and St. Etson, Broadway, New York. Ghana has decided not to enter into any contract on the Volta scheme until the results of the American group's survey are available.

★

Mr. Victor Muscat, president of a U.S. firm, the Victor Metal Products Corporation, claims that his company can make aluminium cans at a competitive price because of a cheaper method of producing aluminium slugs. These slugs are used in an impact-extrusion process, whereby a seamless, rigid aluminium can, including sides and bottom, is punched in a single operation. Hitherto the cost of mass-produced aluminium cans has prevented competition with tin cans in the U.S. However, rising costs of steel and tinplate have prompted American industry to spend vast sums of money during the past several years in an effort to find a practical method of producing aluminium cans. Aluminium and Chemical Corporation, an affiliate of Victor Metal Products, will start construction this month of a plant to produce the slugs. Kaiser has an order for 5,500,000 cans made of aluminium from a food processor. Despite these developments, there is as yet no reason to anticipate major repercussions on the traditional market for tin which, in any event, has tremendous potentialities for further growth.

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Alcoa has selected at 2,000-acre area 28 miles east of Pittsburgh as the future site of a research and development centre.

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It is reported from Belgrade that Yugoslavia is planning to build up its aluminium production to become the world's second largest exporter, after Canada. Within the "foreseeable future", it is stated, output could be increased ten-fold from the 14,500 tons reached in 1956, and Yugoslavia would take fourth place among world producers after the U.S., Canada and the U.S.S.R. Yugoslav bauxite production could be expanded to 1,500,000 tons annually. Bauxite reserves are placed at 100,000,000 tons and are said to contain quantities of titanium, vanadium and uranium.

CHROME SUPPLIES IMPROVE

Arrivals of chrome ore from all sources into the U.K. during the first quarter of 1957 amounted to 41,231 tons compared with 30,727 tons during the corresponding period of last year. Much of the improvement is attributed to increased arrivals from Rhodesia and South Africa.

U.S. COLUMBIUM PRICE

A new price for metallic columbium for high temperature and other applications at $16.00 per lb. in quantities f.o.b. Newfield, New Jersey, has been announced by the Shieldalloy Corporation. Sold in either pellet or powder form, this metallurgically pure form of columbium is claimed to have a maximum tantalum content of 2 per cent, which, the producers claim, should be acceptable for most applications.

★

Recent expressions of optimism regarding columbium' future are supported by the annual report of Kennecott Copper Corporation. Since the termination of the U.S. contracts, this company has been developing columbium sales

through regular commercial channels. The report anticipates the development of markets which will permit profitable operations in the future by Tin and Associated Minerals Ltd., the Nigerian columbite producer, in which Kennecott has a 52 per cent interest.

HOW SCARCE IS NICKEL?

The U.S. nickel trade has taken exception to a report by the Senate Preparedness Investigating Sub-Committee, calling for administration action to alleviate the "serious shortage of nickel, which has resulted in the existence of black and grey markets." Trade quarters said that the sub-committee report appeared to refer more to conditions existing last year than this. Although it is recognized that the metal will doubtless remain in short supply until additional capacity is brought in, the trade asserts that the position is no longer serious and also questions the existence of "hoards" of nickel, as alleged by the sub-committee. It is further pointed out that the so-called "black" market price for nickel is not in the vicinity of $2.50 - 3.00 per lb., as alleged, but is around $1.30.

In Europe the tendency for open market nickel prices to move lower appears to be continuing. Continental price ideas are now indicated at well below £2,000 per ton, a range of £1,600—£1,800 being mentioned. In Britain, the free price is in the region of £1,400—£1,500.

U.S. BARTER DEAL

It has been officially stated at Washington that Turkish chrome ore is not involved in the barter contracts with Turkey announced recently by the U.S. Agricultural Department and reported in our issue of May 3.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The week has again been an active one on the London Metal Exchange with turnovers above the average for the recent past. In general, the undertone for all metals has become weak, although the alteration in the actual price levels over the period has not been as large as might have been expected owing to a technical rally taking place in lead and zinc at the middle of the week.

RALLY IN COPPER PENDING?

The copper price has continued to sag in spite of considerable support, but the general feeling now is that a technical rally is likely to take place very shortly. In spite of an increase in the stocks of official warehouses by 750 tons to 5,297 tons the contango has given way to a backwardation, again on technical grounds, and at the time of writing it is difficult to see how this state of affairs is likely to change until the actual price level of the metal has risen considerably.

In America the producers continue to maintain their price at 32 c. per lb. but custom smelters report good business at 30 c. per lb. and it is known that some metal for export has changed hands even below this figure. The basic scrap price has fallen to 24½ c. per lb. and it is understood that more material is now being offered, which is presumably due to the continued absence of buying interest in Japan and, to a lesser extent, in India. Should the London price for virgin metal hold at its present level only a very small further reduction in the American scrap price is necessary for European buyers to become interested once again in sizeable tonnages.

LITTLE CHANGE IN TIN

The tin market has maintained a normal activity with consumer off-take reported as being good and rumours of activities by the Buffer Stock Manager still current. A small backwardation persists even though stocks in official warehouses rose by 304 tons to 1,540 and, as pointed out last week, should metal commence to flow to the Buffer Stock then this state of affairs will also continue. The fall in shipments of concentrates from Indonesia has not been as sharp as some people thought, as it is now reported that 6,006 l.tons of tin in ore were shipped during the first quarter of this year against 7,033 during the same period last year.

The World Non-Ferrous Metals Survey, prepared by the U.N. Secretariat, brings to light a fact which is often overlooked when considering the tin position as a whole, and this is that the consumption of the metal shows no increase over the years 1925/1949 and, in fact, has not even doubled since 1900, and this in spite of the enormous increase in the production of tin plate. However, the Survey quoted above appears to be open to the criticism of having chosen its statistical base to support a case, as, while it is true that world tin consumption, excluding the U.S.S.R., was about 114,000 tons in 1949, it had risen to 160,000 tons by 1956.

Nevertheless, these figures at least serve to remind us that even though tin consumption may be rising, it is certainly not rising in proportion to the general level of industrial activity; and thoughts along these lines indicate the necessity for having some kind of international agreement to enable tin mining areas to be able to proceed with some certainty, with exploration work to find additional deposits to replace those now being worked. On Thursday morning the Eastern price was equivalent to £781¼ per ton c.i.f. Europe.

THOUGHTS ON STOCKPILING

A somewhat different approach to this problem was expressed in Singapore last week by Sir Ewen Fergusson. In his speech to shareholders of the Straits Trading Company (reported in full on page 631) he had some interesting observations to make on governmental stockpiling of tin, and he left his audience in no doubt that he felt that as a residual buyer the U.S. Government had, over several years, performed a great service alike to the tin producers and to the economies of the tin-producing countries.

Pointing out that the present outlook is one of depletion on the producing side with no indication that replacement of ore reserves by new discoveries is taking place to any appreciable extent, Sir Ewen proceeded to deduce from this that, in the long-term, American stockpiling may prove to have been a sound investment, quite aside from strategic considerations. The inference that the stockpiles can balance the surpluses of yesterday with the shortages of tomorrow was further underlined by his criticism of the U.K. Government's policy of disposing of its stockpile at a time while there was still a small potential surplus of world supply over consumption.

LEAD RALLIES IN LONDON

As foreshadowed last week, a small reduction of ½ c. per lb. in the lead price took place in America at the week-end and although consumers are hoping for a further reduction it seems doubtful whether any further appreciable price cuts will be made. In London the market suffered a sharp dip but recovery soon took place as it became generally realized that the statistical position of the metal on the continent of Europe is still good and that the surplus in this country is unlikely to weigh heavily upon the market.

At a meeting of the St. Joseph Lead Co., it was revealed that about 20 per cent of the production of lead and zinc in the first quarter had been shipped to the stockpile but reports in this country do not indicate the percentage of the two metals, which would have been a very interesting detail. The same company also say that it may become necessary for them to start stockpiling their own metals should present trends continue.

ZINC AGAIN RELAPSES

The zinc market has again suffered a relapse with the American price receding another ½ c. to 11½ c. per lb. and with some very depressing statistics for the April situation to be overcome. In London the market has been helped by technicalities and by the continued existence of a large backwardation which shows no signs of disappearing. Trade in general both here and on the Continent can best be described as moderate.

The figures for April covering the American domestic zinc industry show that by the end of April stocks had risen to 105,599 s.tons which is the largest since January, 1955. The production during the month amounted to 96,506 which gave a record daily average rate. Total shipments were 80,264, of which 23,671 went to the Government stockpile.

Developments with regard to the various stockpile policies have been limited to a statement by Mr. Gray to the effect that his department, the Office of Defence Mobilization, are going ahead with limited purchases for the stockpile so far as funds are available and that the metal is needed to meet objectives: which is merely a repetition of what was said about a fortnight ago. It therefore looks as if the situation is still the same as that stated last week.

Closing prices and turnovers are given in the table on the opposite page.

LONDON METAL AND ORE PRICES, MAY 16, 1957

THE WEEK ON THE L.M.E

	May 9 Buyers	May 9 Sellers	May 16 Buyers	May 16 Sellers
COPPER				
Cash	£238½	£239	£236½	£237½
Three months	£237½	£238	£236	£236½
Settlement	£239		£237½	
Week's turnover	7,000 tons		6,550 tons	
LEAD				
Current ½ month	£95½	£96	£95½	£95½
Three months	£96	£96½	£95½	£96
Week's turnover	6,875 tons		7,300 tons	
TIN				
Cash	£761½	£762	£765	£766
Three months	£760½	£761	£761	£761½
Settlement	£762		£766	
Week's turnover	915 tons		1,240 tons	
ZINC				
Current ½ month	£84½	£84½	£83½	£83½
Three months	£80½	£80½	£79½	£80
Week's turnover	11,550 tons		7,475 tons	

METAL PRICES

Aluminium, 99.5%, £197 per ton

Antimony —
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton

Bismuth (min. 1 ton lots) 16s. lb. nom.

Cadmium 12s. 0d. lb.

Cerium (99% nett), £13 18s. lb. delivered U.K.

Chromium, Cr. 99% 7s. 2d. lb.

Cobalt, 16s.-19s. lb.

ORES AND OXIDES

Bismuth .. .. 30% 5s. 0d. lb. c.i.f. 20% 3s. 3d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (semifriable) 48% .. .. £17 8s. 0d. per ton c.i.f.
,, Hard Lumpy (45%) .. .. £17 8s. 0d. per ton c.i.f.
,, Refractory 40% .. .. £12 15s. 0d. per ton c.i.f.
,, Smalls 42% .. .. £16 5s. 0d. per ton c.i.f.
Baluchistan .. .. £18 15s. 0d. per ton c.i.f.
Columbite, 65% combined oxides, high grade .. .. 185s./197s. 6d. per unit
Fluorspar—
Acid Grade, Flotated Material .. .. £22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2) .. .. 156s. 0d. ex. works

Lithium Ore—
Petalite min. 3½% Li_2O .. .. £8-£10 per ton f.o.b. Beira
Lepidolite min. 3½% Li_2O .. .. £8-£10 per ton f.o.b. Beira
Amblygonite basis 7% Li_2O .. .. £28-£32 per ton f.o.b. Beira
Magnesite, ground calcined .. .. £28 0s./£30 0s. d/d
Magnesite Raw (ground) .. .. £21 0s./£22 0s. d/d
Molybdenite (85% basis) .. .. 8s. 5d. nom. per lb. (f.o.b.)

Titanium Ore —
Rutile 95/97% TiO_2 .. .. £61/£63 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO_2 .. .. £11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%) .. .. 155s./162s. 6d. per unit c.i.f.

Manganese Ore Indian
Europe (46%-48%) basis 140s. freight plus 17½% surcharge .. .. .. 139d nom. per unit c.i.f.
Manganese Ore (43%-45%) .. .. 110d. nom. per unit. c.i.f.
Manganese Ore (38%-40%) .. .. 104d. nom. per unit. (including duty)

Vanadium —
Fused oxide 90-95% V_2O_5) .. .. £12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO_2) .. .. £20 per ton c.i.f.

Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram

Gold, 250s. 4½d.

Iridium, £27/29 oz. nom.

Lanthanum (98/99%) 15s. per gram

Manganese Metal (96%-98%) £310

Magnesium, 2s. 5½d. lb.

Nickel, 99.5% (home trade) £600 per ton

Osmium, £20/22 oz. nom.

Osmiridium, nom.

Palladium, £8 0s./£8 10s. oz.

Platinum U.K. and Empire Refined £33/£33½ oz. Imported £33/£33½ nom.

Quicksilver, £88 ex-warehouse

Rhodium, £42 oz.

Ruthenium, £15/£17 oz. nom.

Selenium, 85s. nom. per lb.

Silver, 79½d. f. oz. spot and 79d. f'd.

Tellurium, 15s./16s. lb.

LONDON STOCK EXCHANGE PRICES, MAY 15, 1957

Finance	Price May 15	+ or — on week
African & European	51/3	—7½d
Anglo American Corpn.	5½	—⅛
Anglo-French	22/-	.....
Anglo-Transvaal Cons.	26/3	.....
Central Mining (£1 shrs)	72/6	+5/3
Consolidated G'fields	52/6	—3/-
Consol. Mines Selection	29/3	+1/-
East Rand Consols	1/7½	.....
General Mining	52/6	—1/3
H. E. Prop.	8/-	.....
Johnnies	38/-	—6d
Rand Mines	71/3	.....
Rand Selection	33/1½	—7½d
Union Corporation	34/-	—3d
Vereeniging Estates	4½	—¼
Writs	34/3	—6d
West Wits.	30/3	+3d
Rand Gold		
Blyvoors	18/9	+3d
Brakpan	4/9	.....
Buffelsfontein	30/10½	+3d
City Deep	11/6	.....
Consol. Main Reef	12/3	+7½d
Crown	20/6	—2/-
Daggas	28/4½	+3d
Dominion Reefs	16/3	—3d
Doornfontein	20/3	+6d
Durban Deep	20/-	.....
E. Champs	2/7½	—1½d
E. Daggas	6/10½	.....
E. Geduld (4s. units)	26/-	+3d
E. Rand Props.	37/6	—1/-
Geduld	67/6	—1/3
Govt. Areas	3/7½	—1½d
Grootvlei	14/7½	.....
Hartebeestfontein	46/4½	.....
Libanon	6/1½	—1½d
Luipaards Vlei	13/-	+7½d
Marievale	17/7½	+1/3
New Kleinfontein	3/-	—4½d
New Pioneer	17/6	—6d
Randfontein	28/10½	+7½d
Robinson Deep	6/10½	.....
Rose Deep	8/6	.....
Simmer & Jack	3/9	.....
S.A. Lands	22/3	—3d
Springs	1/10½	.....
Stilfontein	25/6	+3d
Sub Nigel	16/7½	+1/7½
Vaal Reefs	30/3	+4½d
Van Dyk	2/10½	.....
Venterspost	12/-	.....
Vlakfontein	13/9	.....
Vogelstruisbult	12/3	—1½d
West Driefontein	4½	+⅛

Rand Gold contd.	Price May 15	+ or — on week
W. Rand Consolidated	29/-	—3d
Western Reefs	27/1½	+3d
O.F.S. Gold		
Freddies	4/9	+3d
Freddies Consolidated	3/3	+9d
F.S. Geduld	59/4½	+7½d
Geoffries	2/7½	.....
Harmony	19/-	+9d
Loraine	4/-	+3d
Lydenburg Estates	10/6	+3d
Merriespruit	4/-	+6d
Midale Wits	8/4½	+10½d
Ofsits	46/3	+6d
President Brand	46/6	+9d
President Steyn	25/-	+6d
St. Helena	21/7½	—3d
Virginia Ord.	10/-	+3d
Welkom	13/3	+9d
Western Holdings	59/4½	+7½d
West African Gold		
Amalgamated Banket	1/0½	—½d
Ariston	4/-	—1½d
Ashanti	21/4½	+2/4½
Bibiani	2/9	+1½d
Bremang	1/3	—2½d
Ghana M.R.	1/7½	.....
Konongo	1/4½	—1½d
Marlu	½d	.....
Taquah	1/1½	.....
Western Selection	5/4½	—1½d
Australian Gold		
Gold Mines of Kalgoorlie	12/3	—3d
Great Boulder Prop.	12/3	.....
Lake View & Star	19/1½	—1½d
Mount Morgan	13/-	.....
North Kalgurli	7/6	.....
Sons of Gwalia	1/9	.....
Western Mining	9/1½	—1½d
Miscellaneous Gold		
Cam & Motor	7/9	.....
Champion Reef	6d	.....
Falcon Mines	7/9	.....
Globe & Phoenix	24/9	+3d
Motapa	10½d	.....
Mysore	3d	.....
Nundydroog	6d	.....
St. John d'el Rey	54/-	+3d
Zams	55/7½	.....

Diamonds and Platinum	Price May 15	+ or — on week
Anglo American Inv.	8½	—⅛
Casts.	29/1½	+1½d
Cons. Diam. Pref. of S.W.A.	10/9	.....
De Beers Defd. Regd.	4½	.....
De Beers Pfd. Regd.	13½	—¼
Pots. Platinum	15/-	—3d
Waterval	25/7½	—4½d
Copper		
Bancroft	39/1½	—1/6
Chartered	72/9	—4/6
Esperanza	2/4½	.....
Magundi	8/6	—3d
Messina	8	+⅛
Nchanga	12½	—½
Rhod. Anglo-American	96/3	—2/9
Rhod. Katanga	35/9	—1/-
Rhodesian Selection	21/6	—7½d
Rhokana	38½	—1½
Rio Tinto	4½	—⅛
Roan Antelope	11/3	—9d
Selection Trust	4½	.....
Tanks	8½	+¼
Tharsis Sulphur Br.	4⅛	.....
Tin (Eastern)		
Ayer Hitam	25/6	.....
Gopeng	18/-	+9d
Hongkong	7/1½	—3d
Ipoh	17/3	.....
Kamunting	11/10½	—1½d
Kepong Dredging	6/3	+4½d
Kinta Tin Mines	28/3	+1/1½
Malayan Dredging	18/1½	+6d
Pahang	17/-	+7½d
Pengkalen	19/6	+3d
Petaling	6/7½	+1½d
Rambutan	20/-	.....
Siamese Tin	15/6	—1½d
Southern Kinta	21/10½	—6d
S. Malayan	11/9	—1½d
S. Tronoh	8/7½	.....
Sungei Kinta	22/3	.....
Tekka Taiping	9/6	.....
Tronoh	14/-	.....
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	9/10½	—1½d
Beralt Tin	46/9	—2/9
Bisichi	4/10½	+1½d
British Tin Inv.	26/-	.....
Ex-Lands Nigeria	2/7½	+1½d
Geevor Tin	19/6	—3d

Tin (Nigerian and Miscellaneous) contd.	Price May 15	+ or — on week
Gold & Base Metal	1/3	.....
Jantar Nigeria	3/7½	—1½d
Jos Tin Area	15/3	.....
Kaduna Prospectors	2/-	.....
Kaduna Syndicate	2/3	.....
London Tin	12/9	+4½d
United Tin	10½d	.....
Silver, Lead, Zinc		
Broken Hill South	67/6 XD	—4/-
Burma Mines	3/7½	—1½d
Consol. Zinc	72/9 XD	.....
Lake George	8/7½	—3d
Mount Isa	27/- XD	—6d
New Broken Hill	49/4½ XD	—1/6
North Broken Hill	5½ XD	—¼
Rhodesian Broken Hill	11/1½	—7½d
San Francisco Mines	24/-	—6d
Uruwira	3/1½	—1½d
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A.	2½	—⅛
Associated Manganese	37/9	—3d
Cape Asbestos	11/6 XD	—6d
C.P. Manganese	25/6	—3/-
Consol. Murchison	50/-	+7½d
Natal Navigation	3½	.....
Turner & Newall	139/6	+1/-
Wankie	18/1½	+4½d
Witbank Colliery	5½	—¼
Canadian Mines		
Dome	$26	+¼
Hollinger	$64½	+2½
Hudson Bay Mining	$143	—2
International Nickel	$217	+3
Mining Corpn. of Canada	£6½	—¼
Noranda	$104	—2
Quemont	$5½	.....
Yukon	4/10½	+1½d
Oil		
Apex	54/6	+4/-
Attock	48/9	+2/9
British Petroleum	149/9	+3/-
Burmah	111/9 XD	+5/3
Canadian Eagle	80/-	+2/3
Mexican Eagle	21/- XD	—4½d
Shell	185/-	+3/-
T.P.D.	79/4½	+3/9
Ultramar	75/6	—6d

Mining Finance

Sir Ernest and the Gold Price

It is sometimes surprising that in all the discussion which recurrently is heard concerning this or that country's balance of payments troubles, we do not hear more about the price of gold. The fact that international settlements are still being based on a price for the metal which has not changed for 24 years whereas the price of everything else the world over has advanced sharply during that time, still somehow or other arouses no exceptional comment. It is not surprising that the gold producers themselves should from time to time raise the question of the gold price. There is a tendency in many quarters to regard this as just so much lobbying and special pleading. To tie such a label on the comments made this week on the subject by Sir Ernest Oppenheimer, in his annual review accompanying the report of Orange Free State Investment Trust, would be to do less than justice to the subject in general and to the comments which Sir Ernest has to make in particular.

He recalls that governments and individuals alike look to gold when they distrust the strength of their own currencies and the perils of international tension. The gold mining industry gains from the existence of an unlimited market for its product. But the extent of that gain is limited by the fact that the price of the metal has remained unchanged since 1934. It is true, says Sir Ernest, that the devaluation of sterling and the South African pound in 1949 greatly benefited the industry, but since then prices have risen and the benefit has been greatly narrowed. A further devaluation is not what the industry wants or is looking for but a change in the dollar price of gold.

Significantly, Sir Ernest says that American opposition, which has been bluntly expressed, must be overcome. And he does not think the situation in this respect "unpromising". The U.S. has been accumulating foreign liabilities at a very fast rate but her gold stock has not been increasing in the same ratio. That country, he says, has the greatest possible interest in seeing to it that the price of gold "should be such as to maximize the contribution it can make to the settlement of international trade balances". Most observers feel that sooner or later the Americans will have to agree to a higher gold price. Hitherto, the impression has prevailed that such an increase would be later rather than sooner and this reading so far has proved true. If the subject were more widely discussed along the lines followed by Sir Ernest this week it is conceivable that the change could be brought about sooner than might be thought. However, for this to happen the subject must not be allowed to drop as it so often has in the past.

Meanwhile, "Ofsits" itself has had its best year ever, which is not surprising in view of the continued expansion of operations in the Orange Free State and the entry into the dividend list of several companies in this field. Last year, "Ofsits" income from investments rose from £317,000 to £1,067,000, this representing, in fact, the bulk of revenue since share-dealing profits were negligible. There was thus a net profit of £743,000 against £101,000 in 1955 and this increase has comfortably allowed the company to pay a first dividend of 1s. 6d. per share, the carry-forward still being higher at £249,000 compared with £188,000.

The company's more or less fixed assets comprise large shareholdings in a number of the O.F.S. producers. The recent dividend payments from Harmony, Presidents Brand and Steyn, St. Helena, and Western Holdings will have been mainly responsible for the advance in "Ofsits" earnings during the past year. There can hardly be any question but that this advance is likely to continue as production of both uranium and gold in the O.F.S. continues to expand. The latest balance sheet shows quoted investments at a book figure of £17,287,000 compared with a market value of £32,733,000. For those wishing to be identified with any revival that may be seen in the market, yet who do not wish for a holding in an individual mine, "Ofsits" 10s. shares at 46s. 6d. afford a suitable medium.

NEW TREPCA MOVES

Some criticism was voiced towards the end of last year at the proposals made by the Board of Trepca Mines that the company should be liquidated and the proceeds of the realization of assets distributed to shareholders. The point at issue was not that there should be no distribution of the compensation moneys received in respect of the Yugoslavian lead-zinc properties held before the war, but that the company might not receive adequate recompense for its holding in Bikita Minerals, the Rhodesian lithium operation, and its participation rights in Selection Trust's new explorations.

These objections would now appear to have been largely overcome by the proposals which have just been made for the formation of a new public company, Treselca Ltd., as the result of arrangements made between Trepca and Selection Trust. The formation of the new company, in fact, recognises the two quite distinct elements in the Trepca situation—compensation and new participations—and makes a workable attempt at their segregation.

Treselca starts with a nominal capital of £100 which, however, will be increased to an authorized amount of £500,000 subject to certain proposals being approved. In the first instance, an amount of £447,257 will be issued. The new proposals involve the voluntary winding-up of Trepca and the sale of the company's participations in Bikita, Selco Exploration and Selco Holdings to Treselca. In liquidation, Trepca will acquire for £447,257 cash 1,789,028 Treselca shares. Contrariwise, Treselca will take up the Bikita and Selco interests for £360,442 and will remain with a working capital of £80,000.

For Trepca shareholders the fundamental point of the proposal is that they will be offered Treselca shares on a one-for-four basis and at the same time will be entitled to receive Yugoslav compensation in cash which is expected to come out at the equivalent of 3s. 11d. per Trepca share. Selection Trust will make an offer of 8s. 6d. per Treselca share to those Trepca holders who do not wish to retain their entitlement. This comes out at the equivalent of 2s. 1½d. per Trepca share which together with the cash makes a round figure of 6s. per share.

By these moves, which seem fair enough, all sides would appear to have been satisfied. Those who wish to remain in the Bikita and Selco picture

TRANSVAAL AND O.F.S. GOLD AND URANIUM PRODUCERS
Comparison and analysis of results for first three months of 1957 and 1956

Heading		*Jan. to Mar.*	*Rand Cos.*	*Klerksdorp Cos.*	*O.F.S. Cos.*	*Total*
Tons milled :	Millions	1957	12·6	1·4	2·4	16·4
		1956	13·4	0·9	2·1	16·4
Ounces produced :	Millions	1957	2·7	0·5	0·9	4·1
		1956	2·8	0·3	0·7	3·8
Grade per ton :	Dwt.	1957	4·1	6·9	7·3	4·8
		1956	4·0	6·2	6·5	4·4
Working costs per ton:	s. d.	1957	41/9	52/4	55/7	44/8
		1956	39/11	48/10	52/10	42/1
Working profits :	Gold £m.	1957	6·6	2·4	4·2	13·2
		1956	6·7	1·3	3·1	11·1
Working profits :	Uranium £m.	1957	4·2	1·9	1·4	7·5
		1956	3·7	0·9	1·0	5·6
Total profits :	£m.	1957	10·5	4·3	5·9	20·7
		1956	10·4	2·2	4·1	16·7
Dividends declared :	£m.	1957	—	—	4·0	4·0
		1956	—	—	2·3	2·3
Non-European employees at end-March		1957	249,000	36,000	58,000	343,000
		1956	264,000	20,000	54,000	338,000
Number of Companies included		1957	37	7	10	54
		1956	40	5	11	56

will be able to do so through Treselca, in which a Stock Exchange quotation is to be sought. Those otherwise minded can pull out altogether on what seems a reasonable basis. Trepca shares are currently quoted at 5s. 7½d.

AFRICAN AND EUROPEAN

Among the numerous finance companies in the Anglo American Corporation group, several of which have been issuing their annual reports during the past week, African and European stands out as having bright prospects indeed, however lethargically the share market may have been reflecting this. Last year, "A and E" revenue advanced from £990,000 to £1,300,000, profits before taxation at £1,185,000, against £887,000, going beyond the £1,000,000 mark for the first time in the company's history. The annual dividend last year was lifted to 3s. 3d. per 10s. stock unit compared with the 2s. 6d. paid in 1955 but it is evident from the accounts that policy in this direction has remained conservative.

The impressive feature of last year's performance is the fact that last year's expansion in revenue was achieved in face of a sizeable decline in share dealing profits to no more than £54,000 out of a total income of £1,300,000. On the other hand, dividend income advanced sharply from £633,000 to £994,000 which in turn may be substantially attributable to dividends from the company's holdings in the Orange Free State. To this extent the company has found itself placed similarly to "Ofsits".

African and European's interests however do not stop at the O.F.S., important though they are in this field. The company's coal interests in the Union are of substantial importance as may be gauged from the fact that collieries in which the company is interested last year accounted for 40 per cent of total South African coal sales and 65 per cent of its coke output. Farming, too, plays an important role in A and E's activities.

So far as can be seen, there would appear to be a good chance of a further expansion in income, first because of the Free State's expansion prospects and secondly because of the chances of higher coal prices for which the chairman is campaigning in his annual review. Moreover, the company would be among those suitably placed to take full advantage of any worth-while revival in Kaffir market activity. Even in 1955, share dealing profits brought in £137,000.

DE BEERS' ACCOUNTS

The preliminary profit statement of De Beers Consolidated Mines announced a reduction of nearly £500,000 in net profits. This may have occasioned surprise in view of the record diamond sales achieved in 1956 and the fact that De Beers, despite the widespread group interests beyond diamonds, still derives the bulk of income from the diamond trade. The point here is that the preliminary figures referred only to the parent company, De Beers, itself, and took no account of the experience of subsidiaries and associates. The full accounts this week, which carry Sir Ernest Oppenheimer's review of the diamond outlook commented upon on page 635, put the group's results last year into perspective.

It is now seen that whereas the parent company's profits were lower last year, this being entirely attributable to diamond operations on its own account, consolidated group profits before tax were, in fact, higher at £29,700,000 compared with £29,300,000, of which the net profit attributable to the parent company was £18,100,000 against £18,600,000. These figures, incidentally, have been struck after writing off £2,680,000 for investments. No such an amount, or anything at all, was so written off in the previous year and the report gives no indication of why such a writing-off has been deemed necessary on the present occasion. But for this factor profits would, of course, have been very tangibly higher and it is perhaps a pity that more light has not been thrown on this point.

It need hardly be reiterated that the annual dividends totalling 10s. per deferred share have again been very handsomely covered. This rate has been maintained with a wide earnings cover during each of the past six years. What would normally be regarded as an excessively cautious dividend policy has, in fact, been behind the group's justifiable desire to create a strong backing for the diamond-producing trade.

De Beers' 5s. deferred shares at 97s. 6d. on a 200 per cent annual dividend offer a return of 10.25 per cent to the U.K. investor without double tax relief possibilities. For a company of this magnitude this must still be considered quite unduly generous.

NATIONAL COAL BOARD
DURHAM DIVISION
GEOLOGIST

required for the Staff of the Divisional Geologist at Newcastle upon Tyne, 1.

Salary Range £600 — £1,000 according to qualifications and experience.

Duties will include supervision of boring programmes and will require visits below ground at Mines. Applicants should hold an Honours Degree in Geology and should have completed their National Service.

APPLICATIONS, quoting reference E.V.229/66 should be submitted within 7 days of publication to Divisional Chief Staff Officer, National Coal Board, Durham Division, 7 Side, Newcastle upon Tyne 1.

THE STRAITS TRADING COMPANY, LIMITED

CHAIRMAN'S ADDRESS

At the Annual General Meeting of The Straits Trading Co., Ltd., held in Singapore on May 8, 1957, the Chairman, **Sir Ewen Fergusson,** who presided, said:—

The Report and Accounts for the year ended December 31, 1956, having been in your hands for the prescribed time I shall with your permission take them as read.

Once again I have to report an increase in the amount of ore available to the Malayan Smelters. The Federation of Malaya produced 780 tons more than in 1955. Imports from Siam were up by over 2,700 tons. During part of 1956 the United States Government were spasmodic purchasers of ore for Texas but this purchasing has now ceased and as a result the flow of ore from Siam should be more constant in future.

Smelting Charges

The price of tin was subject to fairly wide movement. What seemed to be a downward tendency, associated with the prospective cessation of stockpile purchasing and of the operation of the Texas Smelter, was reversed when Egypt seized the Suez Canal in July. From then until the end of the year political events had the greatest influence on commodity price movements, and with the outbreak of hostilities between Israel and Egypt there was a sharp increase which took the price of tin in Singapore to $422.87½, the highest price since early in 1953. The average price for the year was $387 per picul ($365.50 for the previous year).

The effect of these events on us as smelters was the unfortunate one of rapidly increasing costs. The prices of oil and anthracite, two most important elements in the smelting process, rose considerably and all other items became more costly. It is not possible for us to adjust at short notice the quite small smelting charge we make when purchasing concentrates and we try to make changes as infrequently as possible.

The small increase we made towards the end of last year has now been found to be inadequate to cover the rise which has occurred in every item of cost. It is inevitable that our charge to the mining industry will have to be adjusted upwards in due course.

Tin Restriction

Apart from the political occurrences which affected tin perhaps the outstanding event was the establishment as a going concern of the International Tin Council with headquarters in London. All important producing countries have now become members and as a result of the deliberations and decisions of the three meetings held last year and the meeting held in March this year the Buffer Stock Manager has now been armed with substantial funds, and a new price range in which he can operate without having to await a substantial drop in prices from current levels.

As residual buyer for some years the U.S. Government performed a most satisfactory role to the mining industry with, I may suggest, permanent benefit in the long run to that country but with inestimable benefit to tin producers and to the countries in which their mines are situated. Let us not forget to express gratitude for the policy the U.S.A. followed and which, by a happy coincidence, only terminated when there was another instrument immediately available to take its place.

So many have so often in recent years drawn attention to the great fundamental changes that have taken place in the outlook for tin since the overwhelming surpluses of the 1930s exerted their pressure on thinking and policy, that it seems hardly worth while reiterating that the present outlook is one of depletion on the producing side with no indication that replacement of ore reserves by new discoveries of any real significance is taking place.

(*Continued overleaf*)

On a long view American stockpiling may well prove to be a sound investment for other than strategic reasons, just as it may well be the opposite that at a time when there is a present indication of a small potential surplus of supply over consumption the United Kingdom should choose this moment to start disposing of its stockpile.

The outlook for tin mining in a prosperous world is a satisfactory one; and the fact that remunerative prices have obtained in recent years has given us the benefit of good returns from our mining investments and helped to sustain our profits. These show a small increase over the previous year.

Bringing Issued Capital More in Line With Assets

Large sums are required to finance the Company's business and it is necessary, and only prudent, not to distribute our annual surplus in full. Replacement of old plant and buildings and purchases of new plant need more money than comes from depreciation allowances, and replenishment of stocks has to be undertaken at steadily rising prices. All these factors must be taken into account in arriving at the recommendations the Directors make regarding disposal of the surplus available.

With the settlement of War Damage it has become opportune to alter the Capital of the Company and bring it more into line with the assets employed in the business. If the Resolutions which have been drawn up and duly notified to stockholders are passed at the Extraordinary Meeting which follows immediately after the present meeting, and which should be a short one and confined to formal passing of the Resolutions, the Issued Capital in our next Balance Sheet will be $12,000,000 of Stock transferable in multiples of $10. Such an alteration does not in any way affect the earning capacity of the Company nor the ability to increase the distributions to stockholders, and the latter can only be decided at the time and in the light of circumstances then existing.

The Balance Sheet

In the Balance Sheet now before you Sundry Creditors and Credit Balance show a reduction over the previous year whereas Bank overdrafts show an increase.

Sundry Creditors reflect amounts outstanding for ore purchased but not settled and at the end of the year there was less outstanding, but with consequent effect on the overdraft.

On the Assets side Works, Land, Buildings and Furniture is conservatively valued. Considerable capital expenditure is still required at Butterworth but when completed we are certain that it will prove to be a most efficient unit.

Investments in Subsidiary Companies remain unchanged and the small increase in amounts due is represented by cash.

Sundry Investments show an increase due to acquisitions of shares in tin producing companies. The aggregate market value is substantially above the book value but varies from year to year as is to be expected with a portfolio so predominantly consisting of shares so susceptible to the world political and industrial climate.

Tin and Tin Ore in Stock and in Transit is conservatively valued after allowing for smelting, treatment and other contingencies.

Fuel and Stores Stocks again show an increase largely due to higher prices. Sundry Debtors and Cash in Hand call for no special comment.

Subsidiary Interests

We continue to suffer disappointment with some of our subsidiary interests. At Karak, owing to the cost of deviation and canalisation required and the other capital expenditure which would be involved in crossing the Bentong River these projects have had to be abandoned and thus only a short life lies ahead of the dredge on its present site. The reserve area is in terrorist country and further investigation of it is not yet possible.

Laboo is not coming up to the high expectations which were entertained from the diamond drilling results and those of the earlier development and the mine is not yet in successful operation. The joint operation of the Jinjang area with The Renong Tin Dredging Company, has again produced satisfactory results and these continue.

Pelam Estate enjoyed another profitable year but we have not yet been able to do anything about the planting of the new area which was to be alienated by the Kedah Government. The explanation is that it has not yet been alienated, for reasons so far unknown to us. We hope that the matter will soon be settled and that our decision to extend our planted area which decision is in conformity with a policy strongly advocated by the Federation Government, will not be frustrated.

The venture in Tanganyika proceeds slowly but plant is now arriving on the site and full-scale operations are only a matter of time. In England the dearth of suitable materials for The British Tin Smelting plant shows no sign of abatement and only spasmodic working has been possible. The placing of the works on a care and maintenance basis may have to be considered.

Malaya's Future Under Self-Government

This year self-government comes to the Federation. It may not be inappropriate to recall that this Company was one of the earliest, if not the earliest, formed for the express purpose of operating in the Malay States. I quote from our Memorandum of Association one of the objects for which the Company was established:—

"To acquire the business of Tin Ore Smelters and General Merchants, now carried on by James Sword and Herman Muhlinghaus in the States of Sunghie Ujong and Selangor, . . . including two Agreements for Concessions for the monopoly of exporting tin ore out of the States of Sunghie Ujong and Selangor, agreed to be granted by the Government of those States to the said James Sword and Herman Muhlinghaus."

We are a truly Malayan Company with our roots and interests firmly established in Malaya and they have grown over the years because of the security and encouragement which have come from sound and stable government.

I see no reason why this should not continue and it is our earnest hope that success, prosperity and happiness will bless the independent Malaya with which our fortunes are so closely linked.

It again gives me great pleasure to commend to you the Staff of the Company and all its associates in Asia, Africa and Europe. I am sure you will wish to record a fully justified tribute to their efforts and loyalty.

The Report and Accounts were adopted.

AMALGAMATED BANKET AREAS

The twenty-first annual general meeting of Amalgamated Banket Areas, Ltd., was held on May 14, in London.

Major-General W. W. Richards, C.B., C.B.E., M.C., Chairman, presided. The following is an extract from his Statement circulated with the Report and Accounts:—

The year ended on September 30, 1956, proved one of the most difficult in the Company's post-war history.

The Strike of African employees, which lasted from November 20, 1955, to February 27, 1956, cost the Company in direct maintenance charges the sum of £137,996.

Members will appreciate that the net loss for the year of £206,000 was almost entirely due to the labour dispute, and in no way discredits the intrinsic value of the Company's undertaking and assets.

The Consulting Engineers' report circulated with the Accounts contains, amongst other things, a detailed appreciation of the Pepe Open-Cast area, and the factors which persuaded the Board to discontinue open-cast operations in August, 1956, and concentrate work in the future on the higher grade underground sections. This was a major policy decision, reached only after detailed investigation and sampling had convinced the Engineers that open-cast operations could no longer be conducted profitably.

We are now conducting development operations at an expenditure rate of £217,000 per annum, as compared with an average rate of £132,000 per annum for the past six years.

The total ore reserves at September 30, 1956, omitting the Pepe open-cast or surface ore, were computed at 1,568,706 tons, of an average value of 5.675 dwts. per ton over a width of 40.19 inches.

It is anticipated that the present high rate of development, to which I have already referred, will henceforth add progressively to the reserves.

The report an accounts were adopted.

MINING ENGINEER—Temporary—required for one or two tours of duty on interesting development work by Iron Ore Mining Company in SIERRA LEONE. Position would suit young mining graduate with some survey experience. Salary according to qualifications and experience. Tours of approximately 15 months, liberal leave on full salary U.K. Return passage paid. Initial kit allowance, camp equipment provided. Write giving full details stating age, married or single, to Sierra Leone Development Co. Ltd., Dept. ME7, City-Gate House, Finsbury Square, E.C.2.

AGENCE MINIÈRE ET MARITIME S A
2, RUE VAN BREE - ANTWERP - BELGIUM
Sworn weighers, samplers of ores, metals and residues.
Agents for shippers at European ports and plants.
Telegrams: Rentiers-Antwerp Telex 3196

THE RIO TINTO COMPANY, LIMITED

REVIEW OF WIDESPREAD ACTIVITIES IN FOUR CONTINENTS

BOARD'S POLICY OF DIVERSIFICATION

FRAMEWORK OF GREAT STRENGTH AND FLEXIBILITY ENVISAGED

OFFER TO KERN OIL COMPANY'S SHAREHOLDERS

MR. GERALD COKE ON WIDENING FUNCTIONAL BASE OF OPERATIONS

The 84th annual general meeting of The Rio Tinto Company, Limited, was held on May 15 at the Chartered Insurance Institute, 20 Aldermanbury, London, E.C.2, **Mr. Gerald Coke** (the chairman) presiding.

Mr. P. H. Truscott (the Secretary), read the notice convening the meeting and the report of the auditors.

The Chairman said:—

In an attempt to improve further the presentation of our Accounts, they have been recast this year and are presented in a form which it is hoped will make them clearer and more easily assimilated. I would in particular like to draw attention to the summary of Salient Features extracted from the fuller Accounts.

Since the end of the year under review your Company has acquired a further holding in The Rio Tinto Mining Company of Canada, which now gives it an interest of just over 50 per cent. in that company. Accordingly, next year it is the intention of the Board to consolidate the Canadian Accounts with those of other subsidiaries, thus giving a more complete picture of the financial affairs of the Group.

I hope that the figures and the letterpress which accompanies them are sufficiently clear and self-explanatory to require no further comment from me. There are, however, two matters concerning the figures to which I should like to draw attention. As I pointed out in my remarks last year, your Company's investments in the Rhodesian Copper Belt remain its principal source of income. The increase in the profit which is shown in the Accounts under review is almost entirely due to the increase in the dividends received from these investments. The dividends paid by your Company will continue to depend on this source of income during the period when the properties of our associated companies in the Commonwealth are coming into production and are engaged in repaying their prior charges.

Secondly, I would draw your attention to the transfer of a further £100,000 to the reserve against investments in subsidiary companies. As explained last year, this reserve, which now stands at £350,000, has been provided to meet abortive exploration costs incurred by these companies. Your Directors consider that this reserve is sufficient to meet any irrecoverable loss of this nature of which they are at present aware.

The dividend this year has, in accordance with our previous practice, been declared free of tax. This method of expressing the dividend is one which has been adopted for many years by the company, but your Directors feel that it is now out of keeping with modern practice and they propose that in future the dividend shall be declared gross.

Spread of Activities

The Review of Operations gives a factual survey of great and widespread activities in four continents. As an active mining group it is indeed our business to explore for and develop mineral resources in any part of the world where such operations can be profitably carried out. Your Board feel that the greatest strength can be achieved for the Group by building its activities on a wide base—wide both in the geographical sense and in the types of minerals mined. In order, however, to make the most economic use of our resources and to set some practical limits to the area of operations, we hope to achieve this strength mainly within the confines of the British Commonwealth with its greater security of working conditions and where our activities can bring the most benefit both to this country and to the Commonwealth as a whole. We aim, moreover, at building up both for the parent company and for the principal company in each country in which a main base of activity is established, a portfolio of investments representing a spread over a range of different metals and minerals.

In pursuance of these objects the associated companies in the Group have continued to seek for economic mineral deposits in four of the principal countries of the Commonwealth — Canada, Australia, the Union of South Africa and the Central African Federation. Where success is achieved, as it has been, for instance, in Canada, this success will be exploited to the utmost.

Offer to Kern Oil

These activities of our associates are establishing the wide geographical base which we seek and will, we hope, lead to considerable diversification in the mining interest of the Group. In order to widen still further the functional base of our operations, your Board have felt that the Group should have an interest in oil, which will give it a stake in a more traditional method of producing power to balance our substantial interest in uranium. We have, therefore, made an offer to the shareholders of the Kern Oil Company, which we hope and believe will be accepted.

In building up the Group we have borne in mind that the strength of a building lies not solely in the strength of the uprights or main frame of that building, but also in the crossbracing which creates resistance to tensions and stresses and so gives ultimate strength to the whole. With this example before us we have arranged for shareholdings in our principal associated company, in one Commonwealth country to be held by the corresponding company in another. You will notice, for instance, from the Review of Operations that three-quarters of the capital of Rio Tinto (Northern Rhodesia) is held by The Rio Tinto Mining Company of Central Africa, The Rio Tinto Mining Company of Canada and The Rio Tinto Mining Company of Australia. This pattern will be followed in other cases where developments of substance are likely to ensue, so that each associated company in the Group will have an interest in the development and prosperity taking place in other parts of the Commonwealth. It will be evident that this arrangement has the further advantage that the technical knowledge gained in one part of the world becomes freely available to technologists in another part, not merely, as in other large groups, because they are part of the same group but, with much more force, because their own company has a financial interest to ensure the success of the sister company. This interlocking of interests is already proving its practical value and we are convinced, will build a framework of great strength and flexibility for the Group.

Moreover, it is our ultimate intention to invite local subscription to the share capital of the Group's main holding companies in Africa and Australia, as has already been done in Canada. We feel that it is to the benefit of those shareholders if the shares acquired by them represent interests and assets not only in their own country but in other parts of the world where the Group is operating.

A Unique Achievement

Within the framework which I have outlined each of our associated companies has been going ahead with the exploration or development of its properties. The Rio Tinto Mining Company of Canada is, of course, farthest advanced in this respect because of the eight uranium mines in the Blind River area which are managed by that company, three are already in production and the remainder will come into operation between July of this year and March, 1958. This bare statement hardly does justice to an achievement which must surely be unique in the world of mining. It is true that the Blind River area is not as remote from communications as some mining camps, but an immense amount of work on roads, services, houses, schools and shops was necessary to provide for the population working at the various mines and for the construction staffs. It is true also that, compared with some other mines, the deposits themselves do not present any special difficulties in mining, but the treatment plants are most complex and cover a large area. Given sufficient time it would not, of course, be a major task to build such plants and set them in operation; but the magnitude of the achievement can be appreciated when it is remembered that from the time when the first contracts for uranium were signed and when the Blind River area was still untouched woodland and lakes to the time when the first mine was in operation was only about 20 months; and it will be under three years by the time all eight mines are in production.

The speed and importance of this dramatic development in mining can be assessed when its relation to some of the other mineral products of Canada is stated. By 1958, for instance, uranium will become the metal of greatest gross value produced in Canada. The annual value of the uranium oxide production will be almost double the 1955 value of nickel production, and it will be the mineral product of greatest value, with the sole exception of oil which will only exceed it by a small margin.

The financial picture is also an impressive one. The estimated capital expenditure on uranium oxide production in Canada is $379 million. of which $265 million is attributable to the Blind River area and $155 million to properties under the management of The Rio Tinto Mining Company of Canada. The Blind River area will be producing 70 per cent. of Canada's uranium oxide, of which the Group will be responsible for about 60

per cent. The total production of oxide by 1962-63 will amount to $1,631 million, of which the Group will have produced some $631 million worth.

These figures give some idea of the value to the Canadian economy of this development in which The Rio Tinto Group has played the leading role. It is also, I think, a matter for satisfaction that such a substantial part of the output of the world's largest uranium field is under British control.

The achievement in Canada has only been possible because of the magnificent teamwork of the whole staff of The Rio Tinto Mining Company of Canada. To this team and to all our Canadian associates we would like to offer a word of respectful admiration and congratulation.

Rhodesia

In Northern Rhodesia our exploration has continued, in association with other mining houses, at an intensified rate. In Southern Rhodesia our main concern has been with the Empress Nickel deposit. This deposit is a large mass of low-grade nickel/copper ore first discovered by Mrs. M. M. J. Leslie. By the beginning of this year we had obtained sufficient knowledge of the deposit to decide to exercise our option to purchase the rights from Mrs. Leslie and our task will now be to prove the extent of the deposit in order to ascertain whether sufficient ore exists to operate on a scale large enough to make the proposition an economic one.

Union of South Africa

In the Union of South Africa the principal matter engaging our attention is the Palabora copper deposit. This low-grade deposit covers three areas, one owned by Transvaal Ore—a company belonging to the Hans Merensky Trust—one owned by the Government and one by the Phosphate Development Corporation—a Government-owned company. Transvaal Ore and the Government have agreed to the grant of prospecting rights over their areas and amicable negotiations are now proceeding with the Phosphate Development Corporation in connection with the rights over the third area. Should the project go forward from the exploration to the development stage The Rio Tinto Group and Transvaal Ore will have a controlling interest of 51 per cent and a substantial interest will also be held by the Newmont Mining Company and their associates.

Australia

In Australia the principal activity of our Australian associates is the development of the Mary Kathleen mine. In this task they have been faced with a number of difficulties and problems, not least those arising from the location of the mine and the nature of the country in which it is situated. We know that the energy and spirit of the team in Australia will make light of all obstacles and it is satisfactory to be able to report that the townsite is already nearly completed, though the mine is not expected to come into production before the end of next year.

Question of Finance

From this brief survey of the Group's principal undertakings in the Commonwealth it will be evident that requirements for further capital to develop promising mines will arise from time to time. In meeting these requirements it will be our policy to retain, in every case, management, even if not de jure, control of the undertaking and we shall always secure for the Group an interest of sufficient size to ensure this. There are some developments, notably the Empress Nickel mine and one or two of the properties of The Rio Tinto Mining Company of Canada, which we hope may in the near future turn out to be sufficiently profitable to bring to the stage of production. If this proves to be the case, I shall have some proposals to lay before you in due course in connection with the raising of the necessary capital.

Spain

I am happy to pay tribute to the continued good relations which exist between ourselves and our Spanish associates. It is satisfactory to learn from the Spanish company that business in Spain has been conducted on a more profitable basis in 1956 than in the previous year. We would like to congratulate our colleagues of the Spanish Board—and in particular Señor Torres, the Managing Director of the Spanish company—on this good news.

Kern Oil—Mutual Advantages

My colleagues and I would wish to record our gratitude to Mr. George Ivey, the Chairman, and his colleagues on the Board of Kern Oil Company for their co-operation in the negotiations which have led to our making the offer to the shareholders of that company. We are confident that, if this offer is accepted, it will on the one hand be of benefit to your company by giving it a stake in the oil industry from which a substantial income is already derived; the acquisition will not, therefore, make additional calls on our present income, as would be the case if we were to use our own resources to engage in exploration for oil. For Kern shareholders, on the other hand, it will bring an exchange into the shares of a company which is actively expanding and will give them diversification of interest in fields other than oil. The staff of the Kern company will, we hope, feel that they are becoming part of a larger family with wider interests but a no less sympathetic attitude to their own particular problems.

Should the offer be accepted, it is your Board's intention to transfer the active control of the company's operations to Canada, which is the most convenient centre from which to manage diverse oil interests in the Western Hemisphere. As you will have seen from the Press, we have also purchased a substantial interest in Devon Palmer Oils Limited. This purchase will build the oil interests of the Group on a triple base—the Kern company's interests in Trinidad and California and the Devon Palmer company's interest in Canada.

Tribute to Executives and Staff

In a Group such as ours so many persons in all parts of the world contribute towards the success and cohesion of the whole that it would be impossible to pay tribute individually to all those who have by their loyalty and hard work helped forward the progress of the Rio Tinto Group of companies. This does not mean, however, that we are unmindful of the contribution they have made, and I hope that they will accept this inadequate word of appreciation as an expression of our gratitude.

The Annual General Meeting is the only occasion when the Board can make public acknowledgment of the work of its full-time members. Accordingly I would like to take this opportunity to offer a word of thanks to our three colleagues who carry the weight of the day-to-day management of the company; to Mr. Duncan, whose imaginative direction and driving force are so invaluable to the Group at this critical stage in its growth; to Mr. Saunders who so ably supports him in all departments but especially on the administrative side; and to Mr. Byers, whose experience and knowledge of our overseas activities, and in particular of Australia, have been a source of strength to the organisation.

A word of gratitude is also overdue to our Finance Director, Sir Mark Turner, whose advice on the financial aspects of the Group's activities, especially in the financing of Northspan and other Canadian uranium mines, has been of enormous value. He gives most generously of his time and experience in the service of the Group and we are indeed grateful for the thought which he gives to all our affairs.

Since our last meeting Baron Guy de Rothschild has joined the Board. We welcome him to our counsels and are especially happy that his presence on the Board will strengthen our financial links with the Continent of Europe. His election will be before you for confirmation later in the meeting.

The report and accounts were adopted and the dividend of 15 per cent free of tax, on the Ordinary Stock was approved.

The retiring directors, Monsieur E. J. V. Laffon and Mr. Frank Byers, O.B.E., were re-elected, and the appointment of Baron Guy de Rothschild as a director was confirmed. The other formal business having been duly transacted, the proceedings terminated with a vote of thanks to the chairman, directors and staff.

GRADUATE WITH MINING DEGREE from a recognised school of mines or university and not more than one year's subsequent experience required by large copper mine in Northern Rhodesia. Successful applicant will initially undergo course covering practical and technical training with view to an official position. Starting salary £864 p.a. rising to £924 p.a. after 12 months, plus variable bonus at present upwards of 50% of basic salary and cost-of-living allowance currently £60 p.a.; also pension and life assurance scheme. Free outward passage. Leave at 41 days p.a. may be accumulated over three years' service. Married accommodation available after twelve/eighteen months' service depending on number in family. Send particulars age, qualifications and experience to Appointments Officer, R.14. Mine Employment Department, Selection Trust Building, Mason's Avenue, London. E.C.2.

In our next issue full particulars will be published of "The Mining Journal Quarterly Review of South African Gold Shares".

DE BEERS CONSOLIDATED MINES, LTD.

(Incorporated in the Union of South Africa)

DEMAND FOR GEM DIAMONDS STILL EXCEEDS MINES' PRODUCTIVE CAPACITY

GROUP'S £80 MILLION INVESTMENTS OUTSIDE DIAMOND INDUSTRY

The following extracts are from the Statement by the Chairman, **Sir Ernest Oppenheimer, D.C.L.,** which has been circulated with the annual report and accounts.

The Group Profit for the year, after providing £9,167,065 for taxation, was £20,592,256. The net profit attributable to our Company was £18,145,649 (£18,616,909 in 1955).

The Consolidated Balance Sheet shows total assets of £153,300,344. In addition, the Group held a stock of diamonds valued at £5,747,175 on the basis of cost of production in the case of the Mining Companies and cost or market value, whichever was the lower, in the case of The Diamond Corporation, and a stock of Mining Stores and Materials valued at £1,526,929.

It will thus be seen that the Group has very large financial reserves which, together with the £15,000,000 capital resources of the marketing companies, not only provides a strong protection for the diamond trade but also permits of the investment of substantial sums in other companies, to which I will now refer.

Investments Outside The Diamond Industry

Through substantial holdings in De Beers Industrial Corporation, Limited, and De Beers Investment Trust, Limited, the Group has very valuable investments in varied undertakings not connected with the diamond industry.

The principal interest of De Beers Industrial Corporation is its joint holding with Imperial Chemical Industries, Limited, of the equity share capital of African Explosives and Chemical Industries, Limited.

The latter Company is benefiting from the large capital expansion programme it embarked upon some years ago, and is undertaking further major extension schemes to keep pace with development in Southern Africa.

Our investment, which incidentally originated in 1898 when our Company established the first dynamite factory in the Union, will become increasingly valuable with the expansion of African Explosives and Chemical Industries. We take particular pride in this Company.

De Beers Investment Trust, Limited, continues to participate in the economic development of both the Union and the Rhodesias. Its interests range from investment in industrial concerns, in gold mines on the West Rand and in the Orange Free State, to coal, and to copper in the Rhodesias.

Income by way of dividends from these investments is steadily increasing and, in due course, De Beers Investment Trust will prove to be an important contributor to the revenue of our Company.

The value of non-diamond investments, including loans to concerns similarly unconnected with the diamond industry, plus the Group cash assets less liabilities totalled £83,070,538 (1955—£73,339,394).

Diamond Research Laboratory

As it is 10 years since the establishment of the Diamond Research Laboratory I feel it is appropriate for me to outline the results so far achieved. The examination of recovery methods by the Laboratory has led to the use of totally new methods as well as the improvement of existing processes, not only by ourselves here in South Africa, but also by producers in the Belgian Congo, Angola, Tanganyika and West Africa.

Work done on the application of diamonds to industry has resulted in more efficient use of diamonds, and a consequent wider application of diamond tools. A method has been found of considerably extending the life of a diamond drill bit.

On the subject of research I should like to refer to the manufacture of synthetic diamonds announced last year by the General Electric Company. The scientists concerned must be congratulated on a striking scientific achievement.

It is too soon to make predictions as to where this achievement may lead. However, in the field of abrasives, it is apparent that further investigation is called for before the synthetic article can compete with the natural one, both as regards cost and quantity.

Prospects Of The Diamond Trade

The diamond market enjoyed a record year, and the sustained heavy demand for gem diamonds continued in excess of the productive capacity of the diamond mining companies.

Since the beginning of 1957 the United States has ceased to stockpile industrial diamonds. There has also been a slight decline in sales of industrials.

In view of these two factors we must be prepared for smaller sales of industrials in 1957. However, taking everything into consideration I look to the future with much confidence.

AFRICAN AND EUROPEAN INVESTMENT COMPANY LIMITED

(Incorporated in the Union of South Africa)

RECORD PROFIT OF £1,235,000

O.F.S. GOLD MINES' FURTHER PROGRESS

The following is an extract from the review by the chairman, **Mr. T. Coulter,** which has been circulated with the annual report and accounts :—

Accounts

For the first year since its inception in August, 1904, the company made a profit exceeding £1,000,000. The net profit for 1956 at £1,235,233 exceeded that earned during the previous year by £316,757. This is the more gratifying in view of the relatively small contribution to the total made by profits on share transactions when compared with previous years.

Income in the form of dividends and interest at £994,249 was £360,643 higher than in 1955. The substantial improvement in this item of revenue is, of course, principally due to increasing returns on the company's considerable investment in the Orange Free State goldfield and we can look forward to further improvements in our revenue from this source in the next few years. In addition, higher dividends were received from certain colliery interests.

After adding in the unappropriated profit brought forward of £252,026 an amount of £1,487,259 was available for appropriation. This was dealt with as follows:

Provision for taxation absorbed £78,500, the book value of shareholdings in subsidiary and other companies was reduced by £250,000 and an amount of £200,000 was transferred to general reserve.

The dividend on the ordinary capital was raised to 3s. 3d. per stock unit as compared with 2s. 6d. for the previous year. An unappropriated profit of £150,288 was carried to the balance sheet.

At December 31, 1956, shareholdings and other interests, apart from those in subsidiary companies had a market value of £14,740,190, which was slightly in excess of the figure for the previous year. The book value of these assets was £8,030,600.

Loans to affiliated companies and others show a substantial reduction compared with the previous year reflecting the provision of £500,000 which it was decided to make in respect of doubtful loans to certain companies.

Revenue reserve now stands at £3,000,000.

O.F.S. Gold Mining Industry

During 1956 a further impressive improvement was achieved in the overall operating results of the eleven mines currently producing in the Orange Free State. A total of 9,409,000 tons was milled and, at a grade of 6.732 dwt., 3,167,011 ounces of gold were recovered to give a working profit of £14,644,277, an increase of £5,651,488 over the previous year.

President Brand Gold Mining Company Limited distributed a total of 3s. 6d. per share and President Steyn Gold Mining Company Limited 1s. 9d. per share. The third company in which we have a large shareholding, namely, Welkom Gold Mining Company Limited, has not yet reached the dividend paying stage but improved gold operating results and the start of uranium production hold promise for the future.

In addition, of course, considerable profits are being derived from the production of uranium oxide. During 1956, 1,802,629 lb. of uranium oxide were recovered by Orange Free State producers and working profit from this source was £4,512,780 — more than double the amount earned in the previous year. The current output of the four uranium plants in the Orange Free State is approximately 180,000 lb. of uranium oxide per month, giving an estimated monthly working profit of £470,000.

There appears to be every prospect that the demand for uranium will continue after termination of the existing ten-year

contracts. By that time the cost of the uranium plants will be fully amortised and loans raised through the Atomic Energy Board to finance the construction of the plants will be repaid. The producing companies should therefore be favourably placed in securing a participation in any future production programme for the sale of uranium from South Africa.

The South African Coal Industry

Following upon increases in the controlled price of Transvaal and Natal coal during 1955, the operating results of all collieries have shown an overdue improvement.

The internal consumption of coal continues to increase and the total sales output for 1956 at 35,569,818 tons was approximately 2,500,000 tons more than for the previous year and 5,500,000 tons more than 1954. Estimates indicate that demand will continue to increase steadily.

Profit Margins: Increased recruiting costs and higher wages on the one hand reduce the already small margin of profit allowed to South African collieries and on the other hand, mechanisation, if undertaken to any significant extent, involves heavy capital expenditure on which no adequate return can be expected.

Price increases are, of course, granted from time to time but in the nature of things only when they are overdue. It will therefore be appreciated that the benefits arising from increases granted for Transvaal and Natal coal in 1955 are already being reduced—and this despite continuous improvements in efficiencies.

Some pride can be taken in the fact that the industry can still operate profitably with pithead prices of the order of 10s. 9d. per ton in the Transvaal and 17s. per ton in Natal but the long-term problems created by narrow profit margins must be recognised and sympathetically treated by the Government and by Government departments. This means that the question of prices for bituminous or other coals must be considered not only against rising costs of labour pneumoconiosis liabilities, equipment and other such factors but also against the financial demands which will be made on the industry if it is to meet its obligations to supply the country with ever-increasing quantities of coal.

Sales: During the year 1956 the total sales of coal mined in the Union amounted to 35,569,818 tons, as compared with 33,065,650 tons in 1955. Collieries in which your company is directly or indirectly interested sold 14,182,093 sales tons, representing 40 per cent. of the total.

Excluding coke produced by the South African Iron and Steel Industrial Corporation Limited, for its own purposes, the total Union output of coke in 1956 was 769,347 tons, of which a colliery in which your company is interested produced 502,964 tons equal to 65 per cent. of the total.

ORANGE FREE STATE INVESTMENT TRUST LIMITED

(Incorporated in the Union of South Africa)

O.F.S. MINES' OUTSTANDING ACHIEVEMENTS IN GOLD AND URANIUM PRODUCTION

SIR ERNEST OPPENHEIMER'S REVIEW

The following are extracts from the review by the Chairman, **Sir Ernest Oppenheimer,** which has been circulated with the annual report and accounts :—

The satisfactory mining progress that has so far been achieved in the Orange Free State in the production of both gold and uranium is evident in the dividends paid during 1956 by certain of the mining companies in which our company holds major investments. President Brand, President Steyn, and Western Holdings paid dividends totalling 3s. 6d., 1s. 9d., and 3s. 6d. per share respectively, as compared with the 1955 maiden dividends of 1s., 6d. and 1s. 6d. In addition, St. Helena paid a maiden dividend of 6d. per share, followed by a further dividend of 7d. per share, making a total of 1s. 1d. for the year 1956. Harmony also commenced paying dividends with a maiden declaration of 6d. per share. The total income derived by our company from these various sources amounted to £1,059,822. Since the end of the year under review, President Brand, President Steyn, and St. Helena have declared increased dividends of 2s. 6d., 1s. 3d., and 9d. respectively, while there was no change in the declarations by Harmony and Western Holdings.

The total revenue received by our company during 1956 amounted to £1,070,865, an increase of £666,611 over the revenue for the previous year.

Profit for the year amounted to £742,802, an increase of £641,667 on the profit for 1955 and when added to the unappropriated profit brought forward from 1955, made available for appropriation a total amount of £930,814. As a result, a maiden dividend declaration of 1s. 6d. per share was made last January, absorbing £681,570. Unappropriated profits of £249,244 were carried to the balance-sheet.

Net expenditure on quoted shareholdings rose by £350,000 to reach the figure of £17,286,583. The market value of these holdings at December 31, 1956, was £32,733,663.

New investments include shareholdings in two new Orange Free State gold mining companies. The first of these is Free State Saaiplaas Gold Mining Company, Limited, which company's lease area lies north of the property of the Harmony Gold Mining Company, Limited. The second is the Riebeeck Gold Mining Company, Limited, whose mining lease area lies south of Loraine Gold Mines, Limited.

Uranium and Gold Production

The output from the Orange Free State mines at present amounts to about 180,000lb. of uranium oxide per month, with an estimated monthly working profit of approximately £470,000. The extensions now being made to the treatment plants at the President Steyn and Welkom mines should result in the additional production of about 10,000lb. of uranium oxide per month.

Continuity of production is ensured at present by the 10-year contracts entered into for the sale to the Atomic Energy Board of the entire output of all uranium treatment plants. There also appears every prospect that the demand for uranium will continue after termination of the existing contracts.

The year under review has been a record one for the gold mining industry in South Africa. The output of gold during the year reached a new summit of 15,892,935oz. which exceeded the 1955 record total by 1,290,668oz.—a rise in output of 8.8 per cent. Almost the whole of this increase came from the expanding operations of producers in the Orange Free State. These mines milled 9,409,000 tons of ore during the year, from which 3,167,011oz. of gold were produced—an average yield of 6.732 dwt. per ton. Although the average price of gold during the year fell slightly from £12 10s. 4d. to £12 9s. 9d. per fine ounce, there was an improvement of .655 dwt. over the average yield for 1955. Average working revenue increased substantially from 76s. 5d. per ton of ore milled in 1955 to 84s. 7d. per ton in 1956. Average working costs also rose, but only from 51s. 2d. to 53s. 5d. per ton milled. The total working profits from gold of the Orange Free State producers increased by 61 per cent.—from £9,092,789 to £14,644,277.

These impressive results mark the end of the first decade of mining development in the Orange Free State. Within this short time, the new goldfield has established itself as a growing economic force in South Africa.

Investment in Gold Mining

There are important considerations to be borne in mind when investment in gold mining is weighed against possible alternative forms of investment. Gold is a universally acceptable commodity, and it enjoys an unlimited market at guaranteed prices. International monetary arrangements are to-day more firmly based on gold than they have been since the great depression of the 'thirties. A feature of every post-war international crisis to date has been the purchase of gold as a hedge against currency depreciation, and as a means of holding liquid funds in a form less vulnerable to the hazards of war, or possible war, than paper money or bank balances. Governments and individuals alike look to gold when they distrust the strength of their own currencies and the perils of international tension.

The gold mining industry greatly gains from the existence of this unlimited market for its product, but the extent of that gain is affected by the fact that the dollar price of gold has remained unchanged since 1934. Even though all the gold produced can be sold without difficulty, the fact that the sale price is rigid places an unfair limitation on the profits derived from gold mining.

The British and South African Governments have already expressed themselves strongly in favour of an increase in the dollar price of gold, but before action is possible, American opposition—and it has been very bluntly expressed—must be overcome. I do not think the situation in this respect unpromising. The United States has been accumulating foreign liabilities at a very fast rate, whilst her gold stock has not been increasing in the same ratio. Moreover, not only is the United States expected to come to the assistance of the "under-developed world" by means of massive long-term grants, but every foreign exchange crisis nowadays is likely, in the last resort, to involve United States aid. That country has, therefore, the greatest possible interest in seeing to it that the price of gold should be such as to maximize the contribution it can make to the settlement of international trade balances.